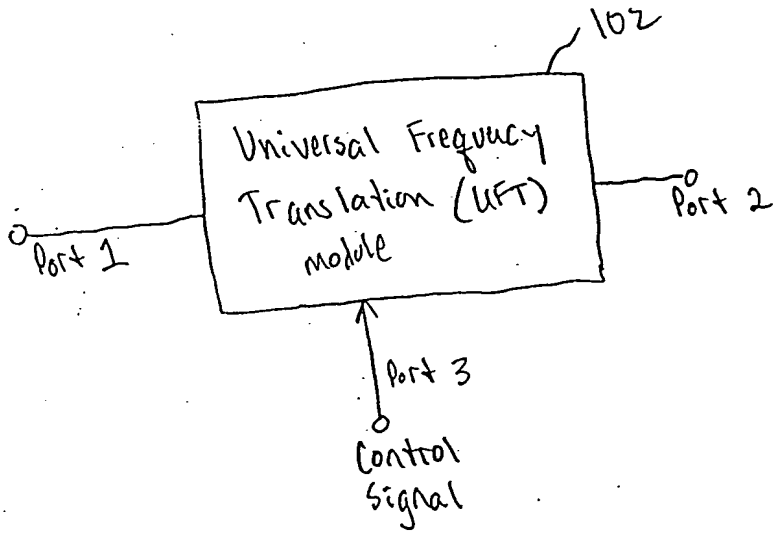

102
Universal Frequency Translation (UFT) module
Port 1
Port 2
Port 3
Control Signal

FIG. 1A

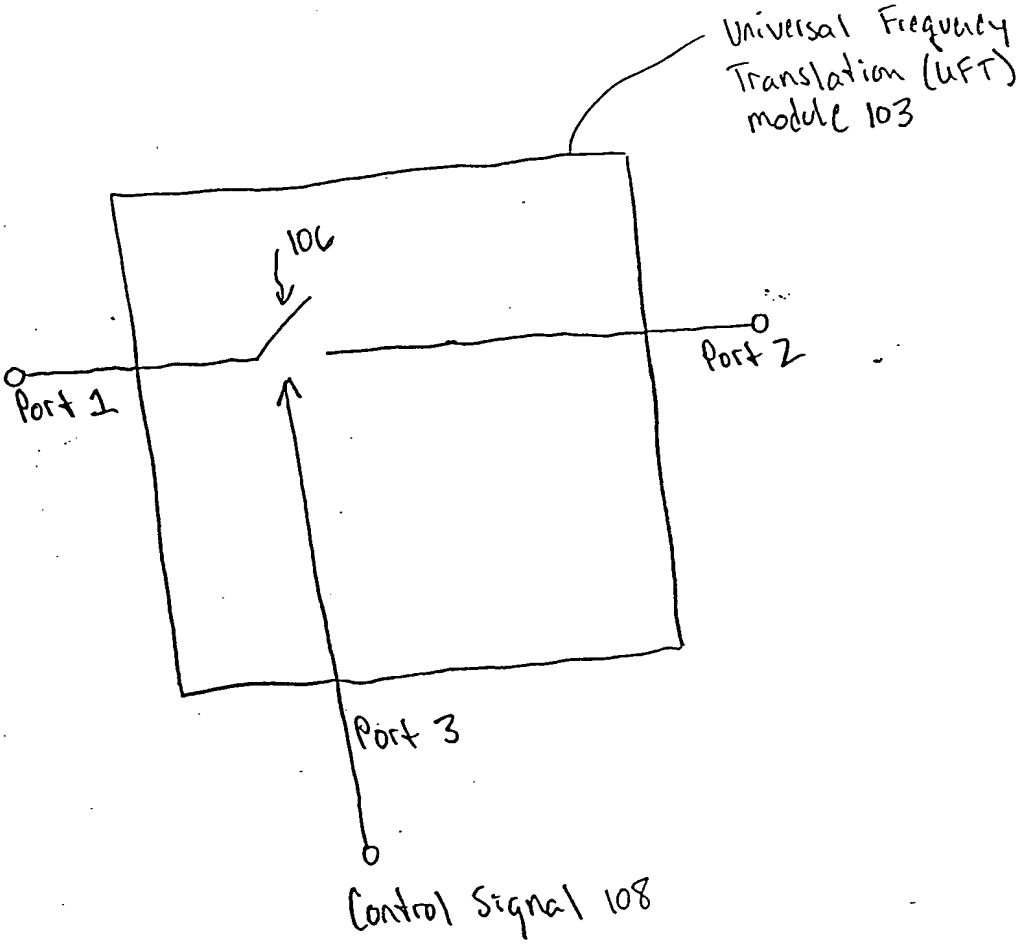

Universal Frequency Translation (UFT) module 103
106
Port 1
Port 2
Port 3
Control Signal 108

FIG. 1B

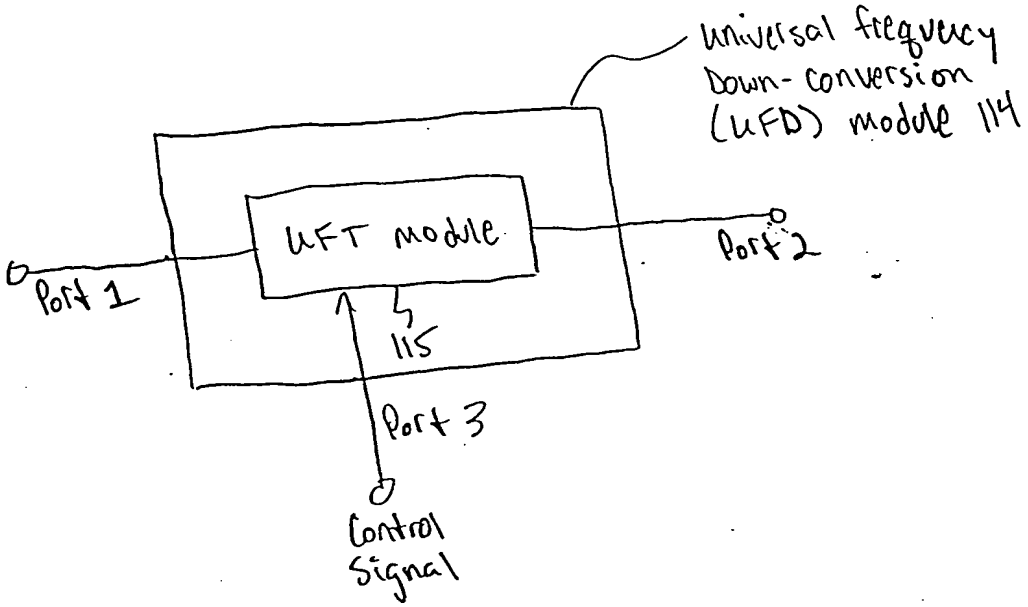

universal frequency
Down-conversion
(UFD) module 114
UFT module
Port 1
Port 2
115
Port 3
Control
Signal

FIG. 1C

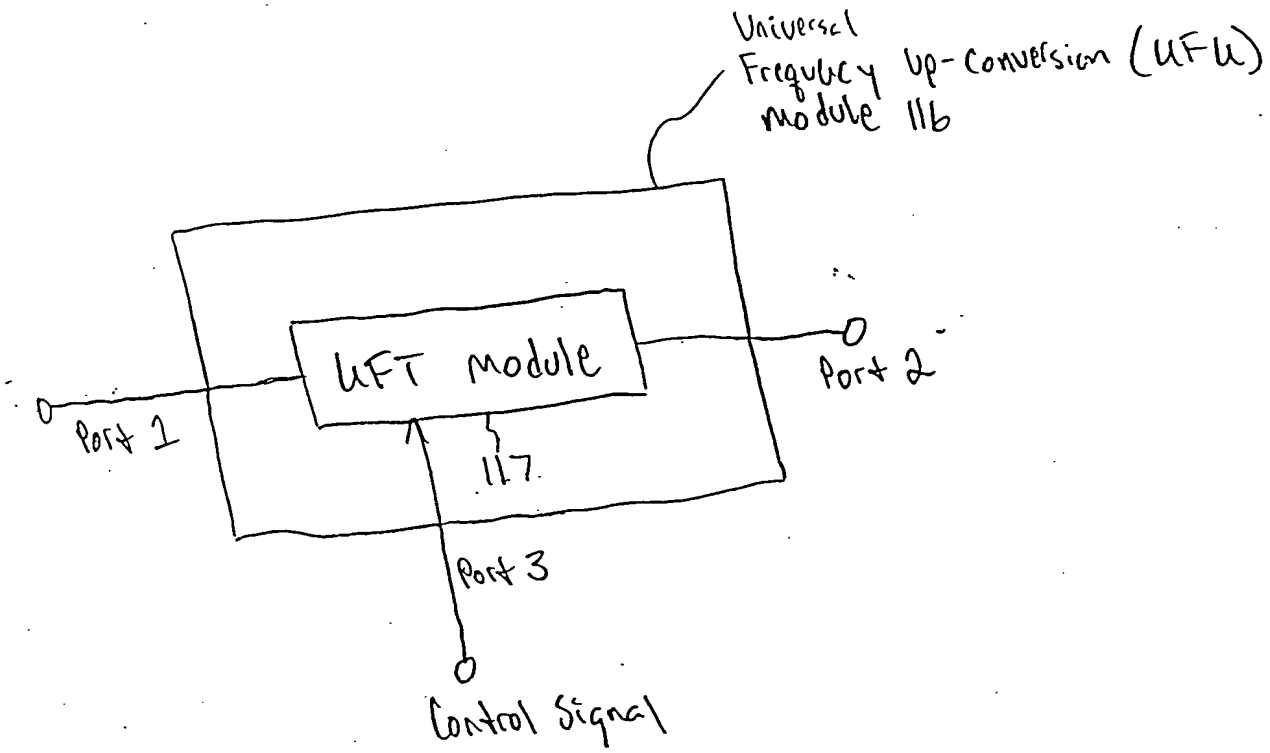

Universal
Frequency up-conversion (UFU)
module 116
UFT module
Port 1
Port 2
117
Port 3
Control Signal

FIG. 1D

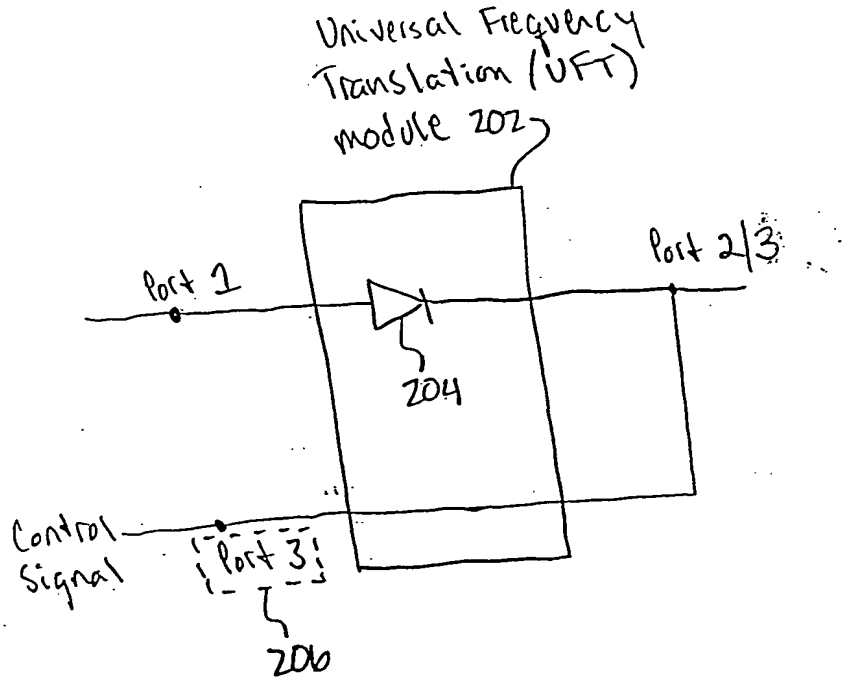

Universal Frequency Translation (UFT) module 202
Port 1
Port 2/3
204
Control Signal
Port 3
206

FIG. 2A

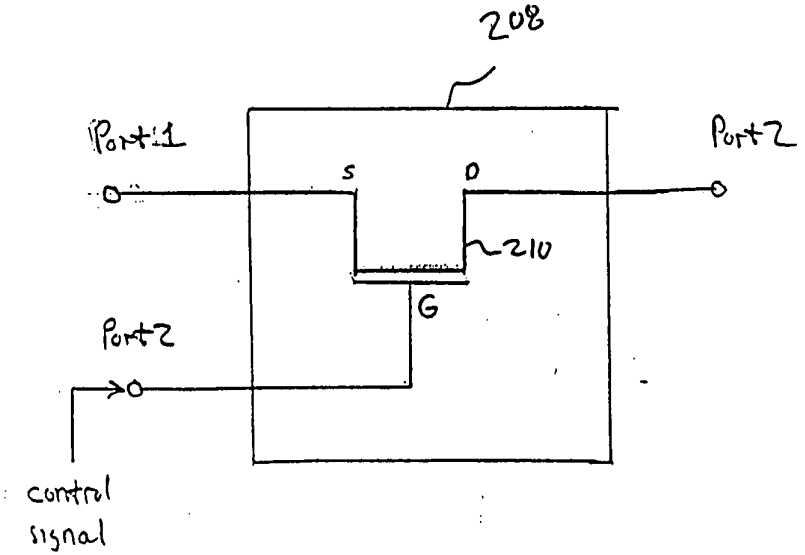


FIG. 2B

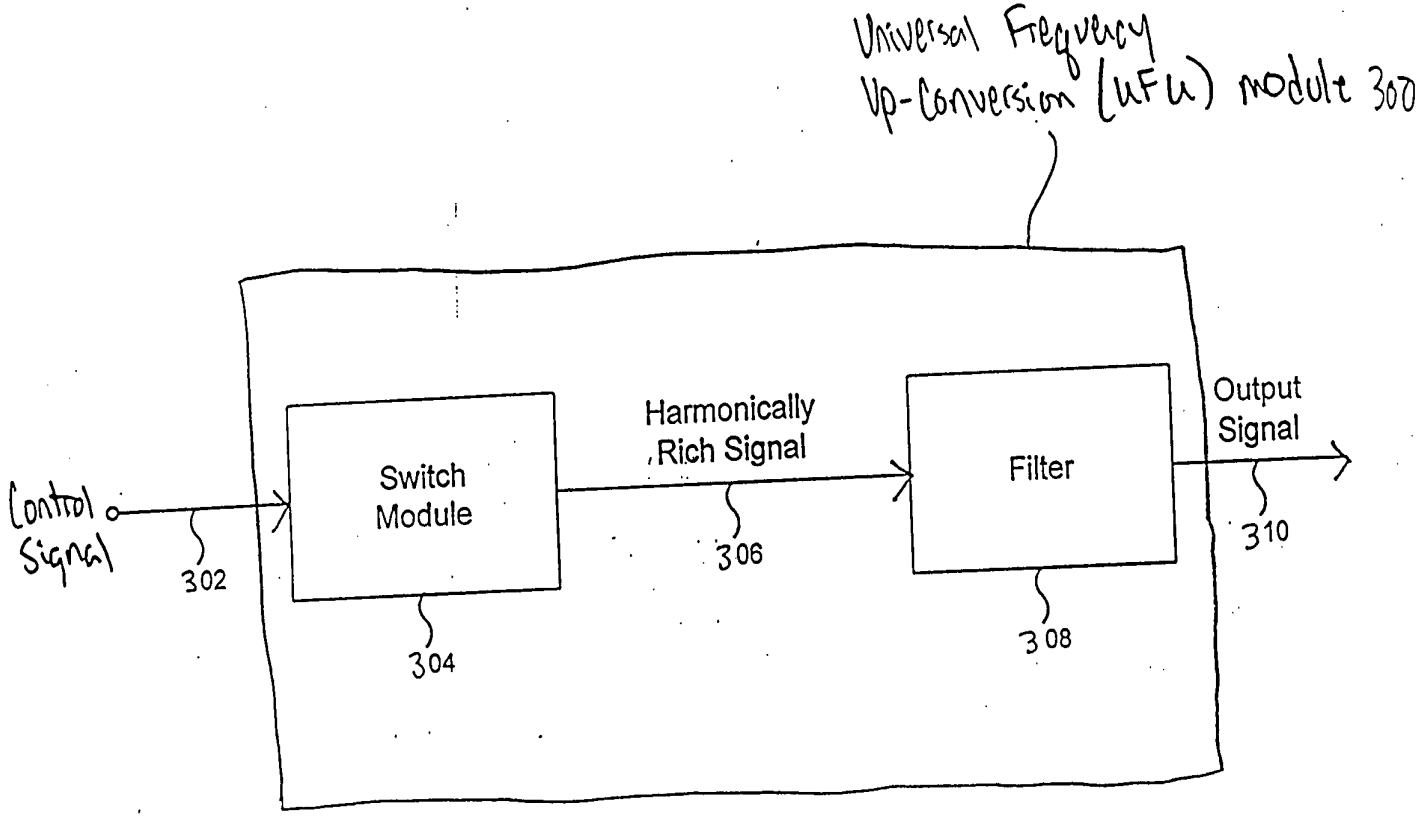

Universal Frequency
Up-Conversion (UFU) module 300
Control Signal
302
Switch Module
304
Harmonically Rich Signal
306
Filter
308
Output Signal
310

FIG. 3

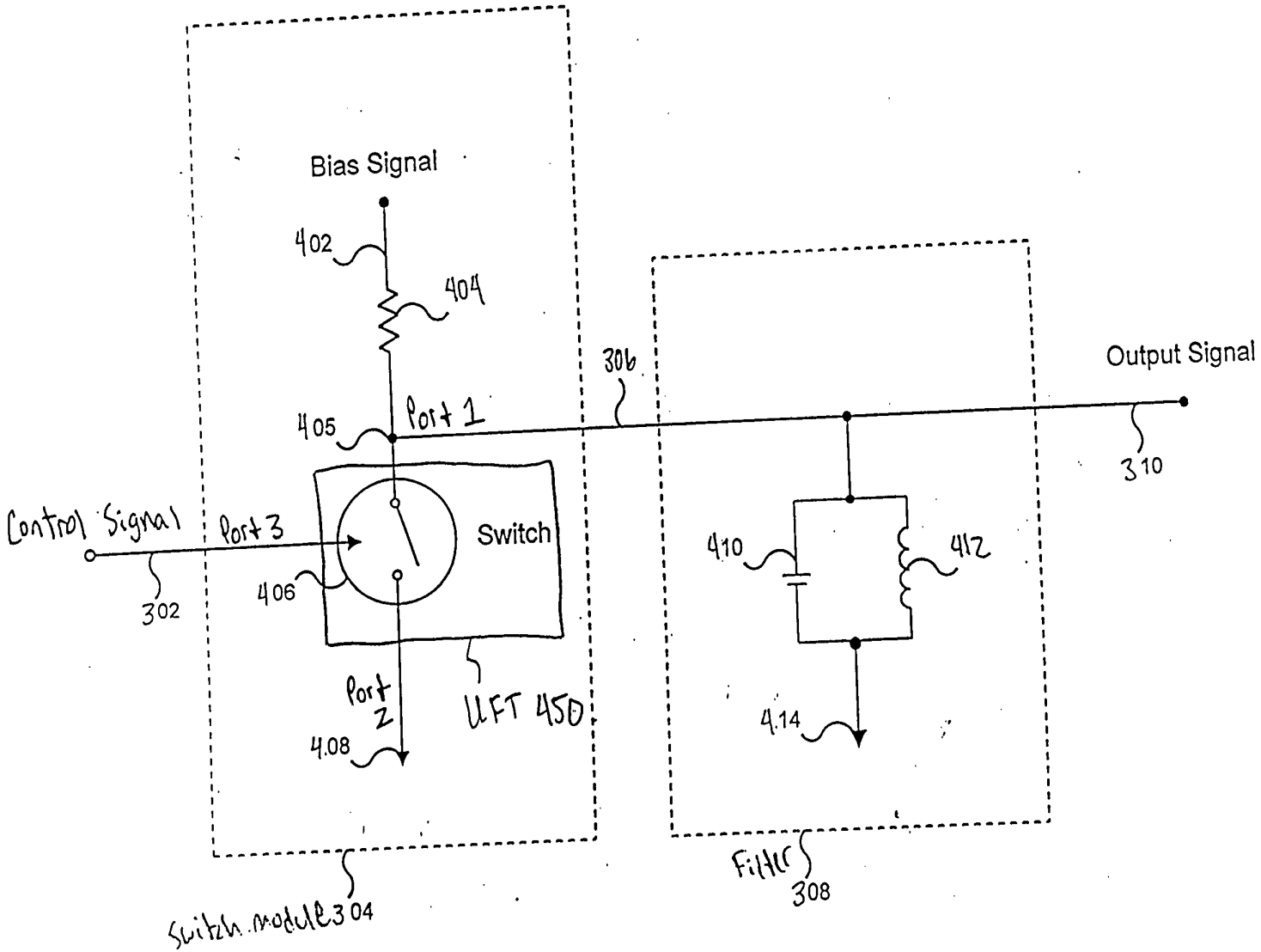


FIG. 4

3

Universal Frequency Up-conversion (UFu) module 590

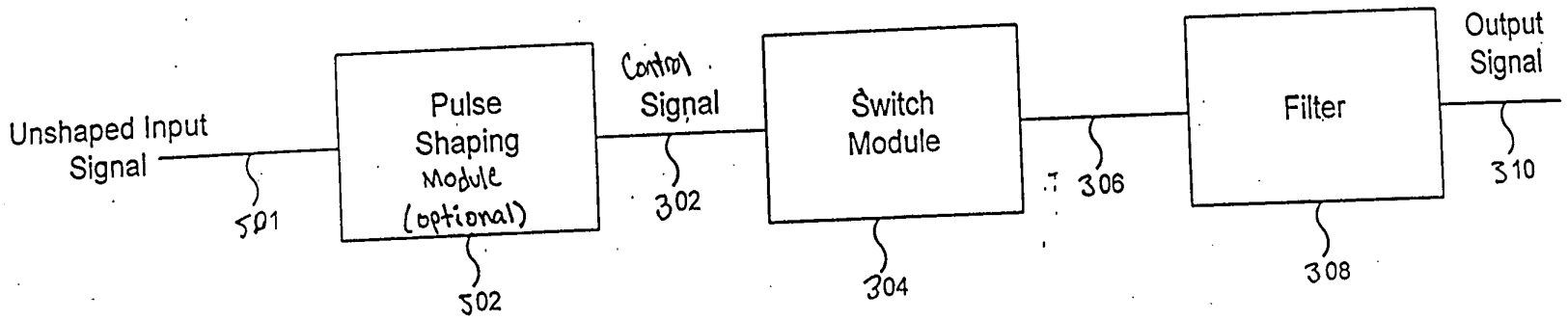


FIG. 5

INFORMATION SIGNAL 602

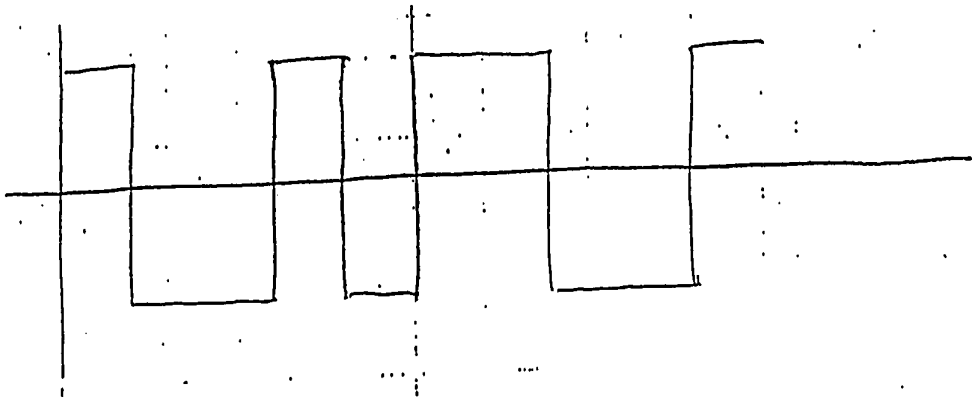


FIG. 6A

OSCILLATING SIGNAL 604

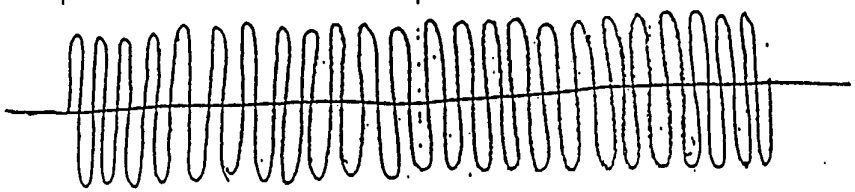


FIG. 6B

FREQUENCY MODULATED INPUT SIGNAL 606

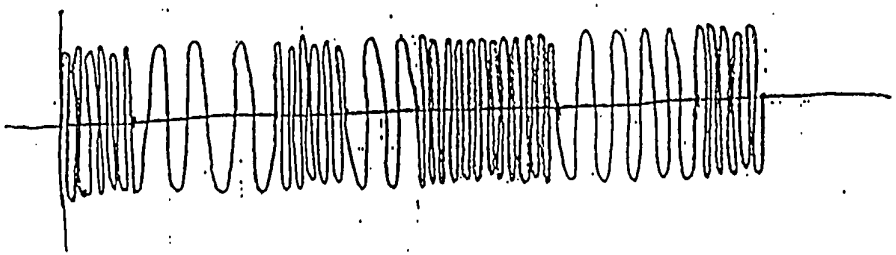


FIG. 6C

HARMONICALLY RICH SIGNAL (SHOWN AS SQUARE WAVE) 608

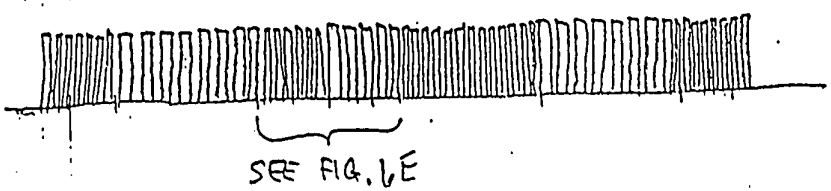


FIG. 6D

FIG. 6

EXPANDED VIEW OF HARMONICALLY RICH SIGNAL 608

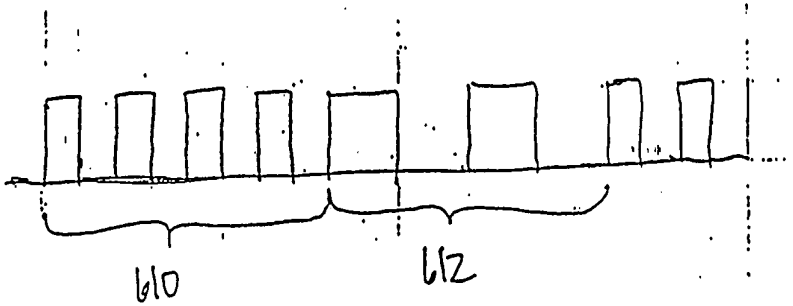
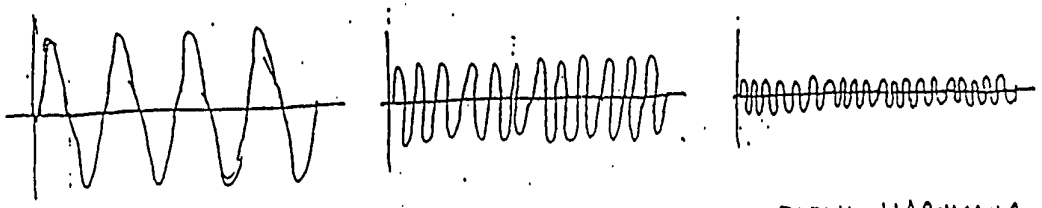


FIG 6E

SEE FIG. 6F

SEE FIG. 6G

HARMONICS OF SIGNAL 610 (SHOWN SEPARATELY)



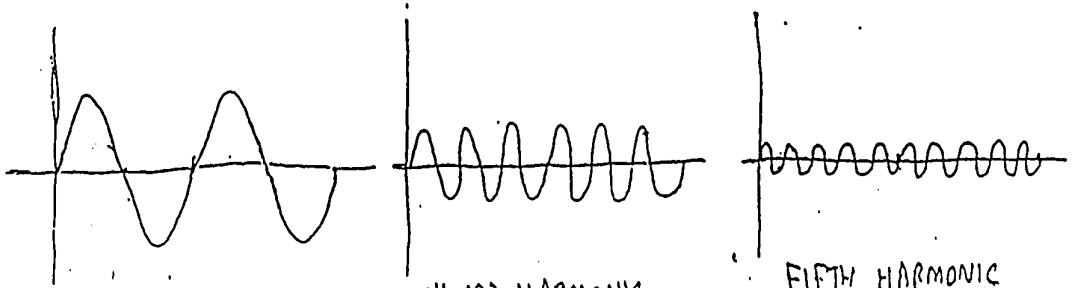
FUNDAMENTAL FREQUENCY 610A

THIRD HARMONIC 610B

FIFTH HARMONIC 610C

FIG. 6F

HARMONICS OF SIGNAL 612 (SHOWN SEPARATELY)



FUNDAMENTAL FREQUENCY 612A

THIRD HARMONIC 612B

FIFTH HARMONIC 612C

FIG. 6G

FIG. 6 (cont.)

HARMONICS OF SIGNALS 410 AND 612. (SHOWN SIMULTANEOUSLY BUT NOT SUMMED)

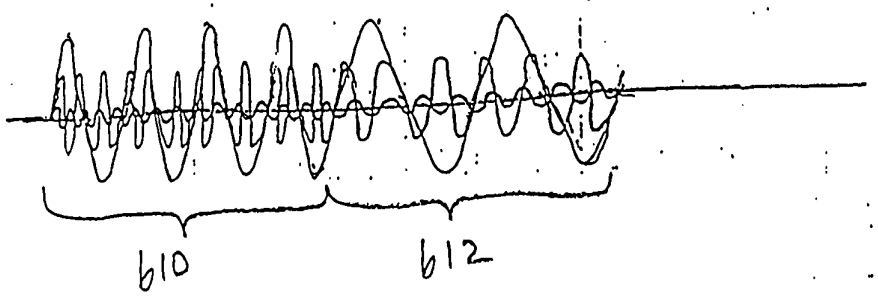


FIG 6H

FILTERED OUTPUT SIGNAL 614

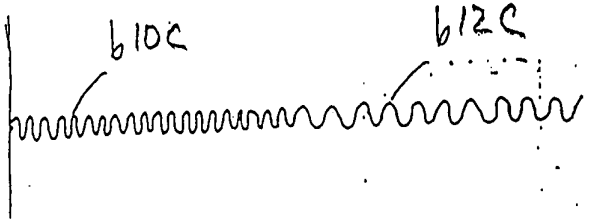


FIG. 6I

FIG 6 (cont)

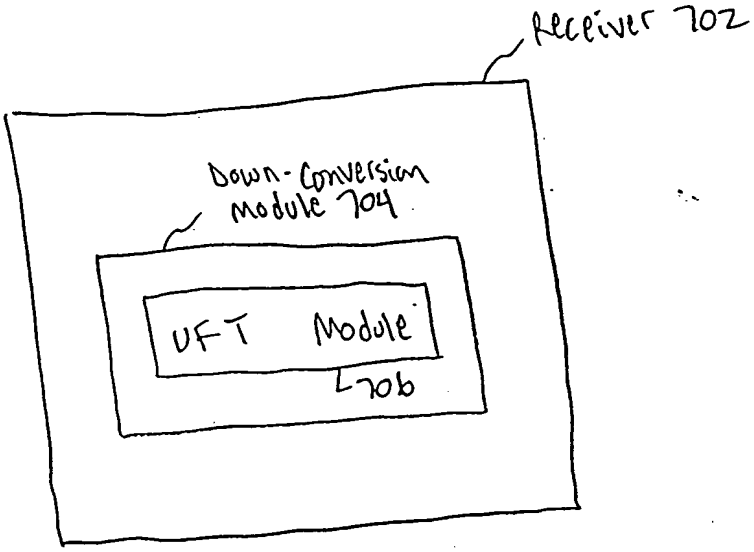


FIG. 7

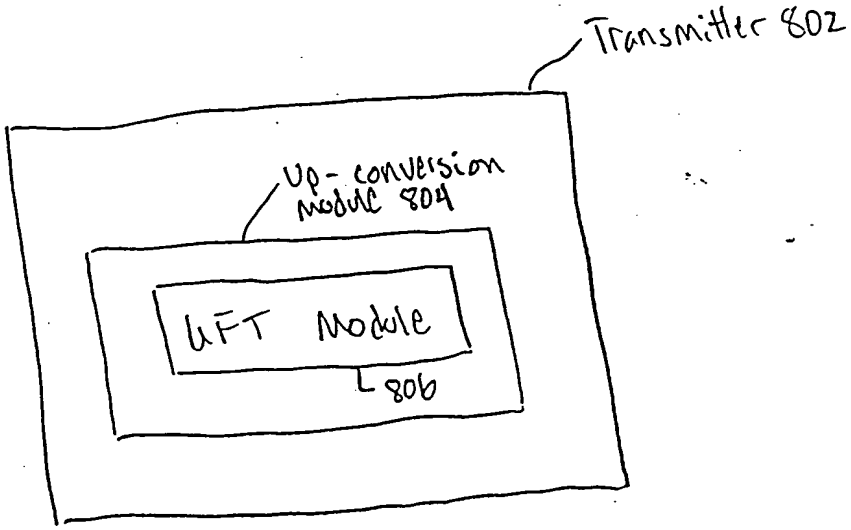


FIG. 8

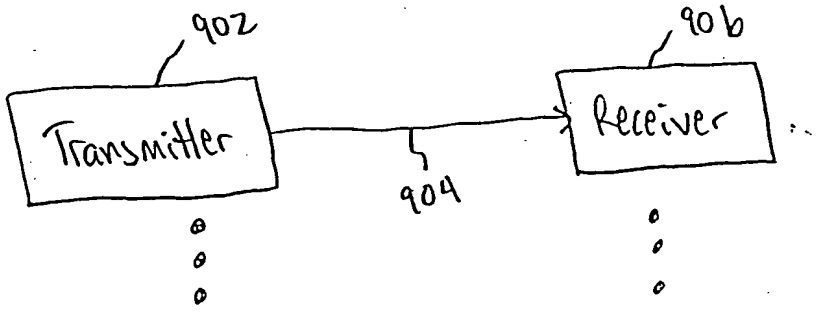


FIG. 9

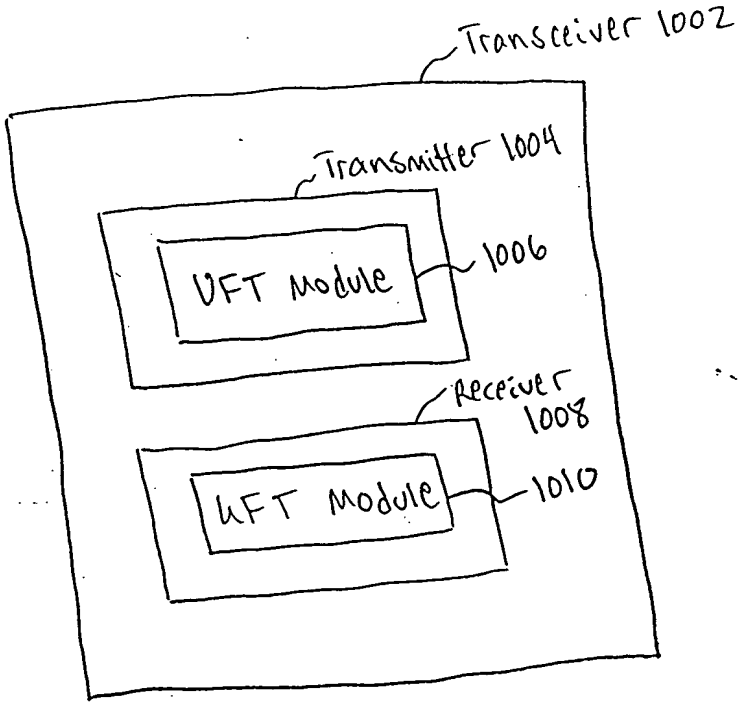

Transceiver 1002
Transmitter 1004
UFT Module
1006
Receiver
1008
UFT Module
1010

FIG. 10

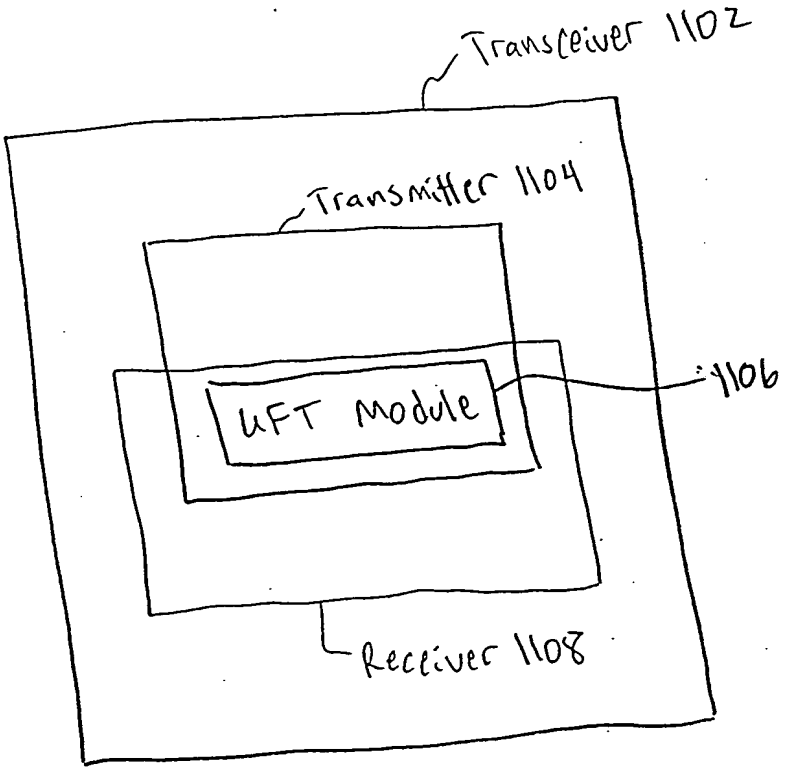

Transceiver 1102
Transmitter 1104
UFT Module
1106
Receiver 1108

FIG. 11

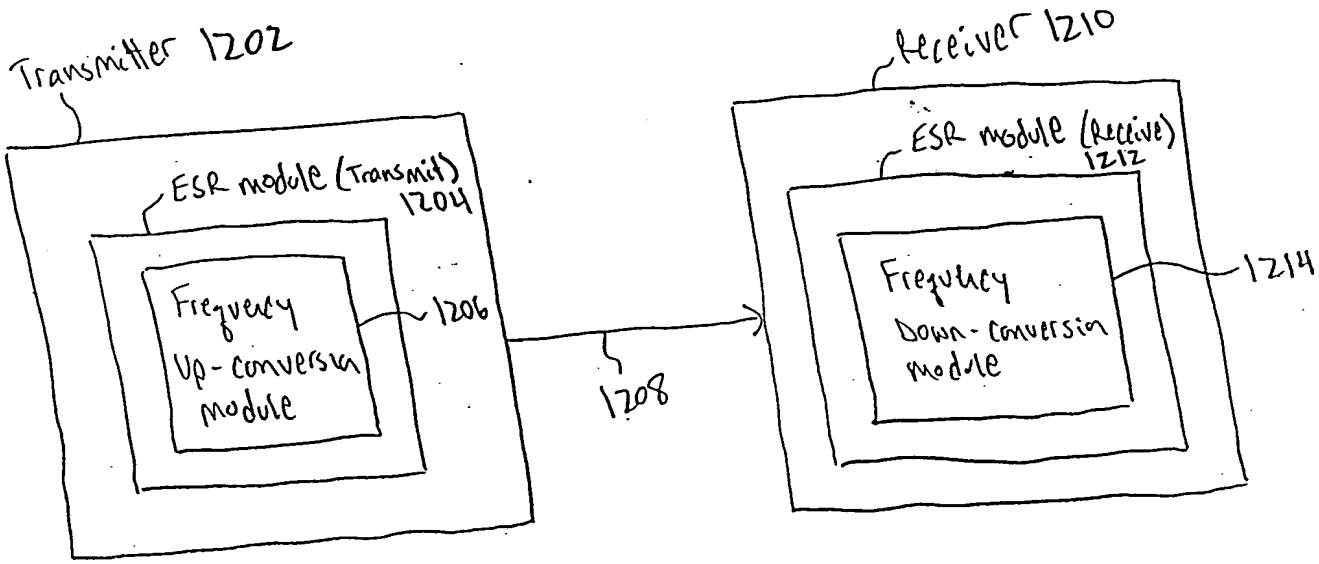

Transmitter 1202
ESR module (Transmit)
1204
Frequency
Up-conversion
module
1206
1208
Receiver 1210
ESR module (Receive)
1212
Frequency
Down-conversion
module
1214

FIG. 12

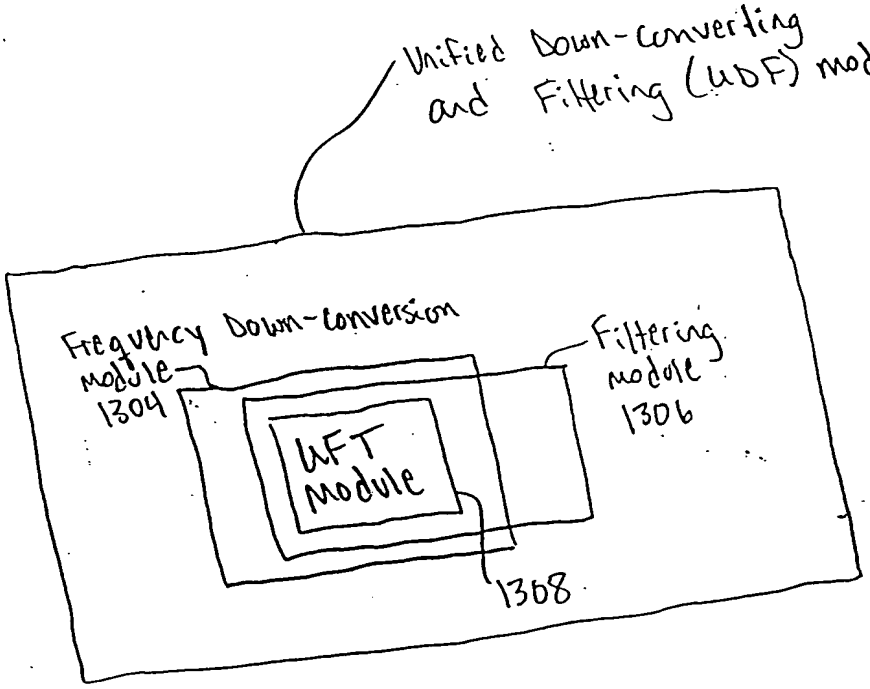

Unified Down-converting and Filtering (UDF) module 1302
Frequency Down-conversion module 1304
Filtering module 1306
UFT module
1308

FIG. 13

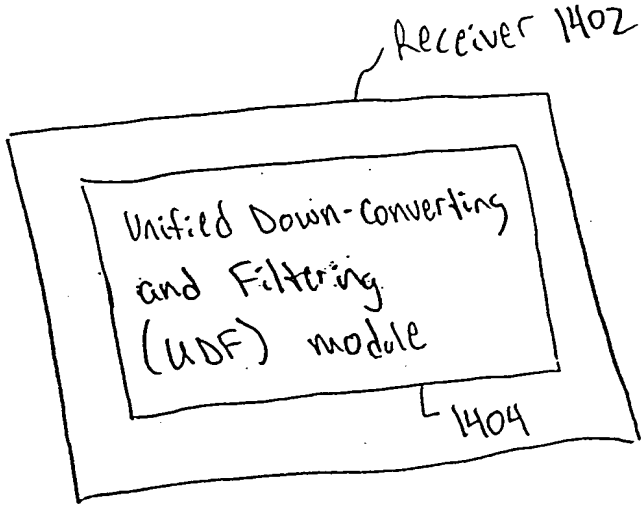

Receiver 1402
Unified Down-Converting and Filtering (UDF) module
1404

FIG. 14

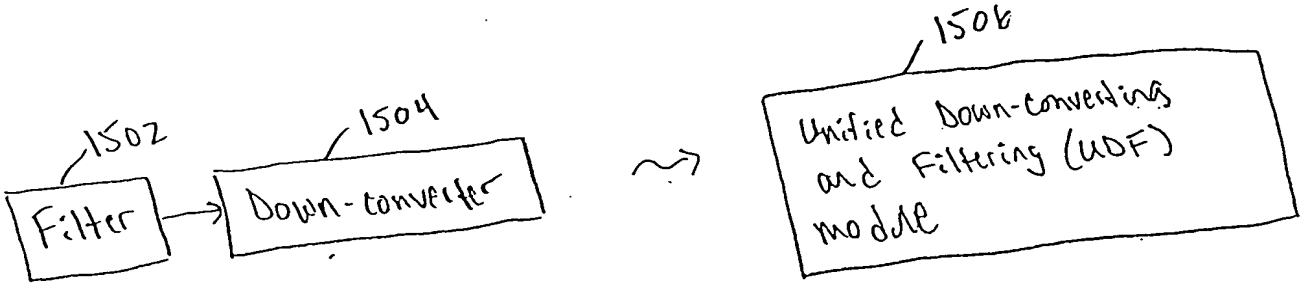


FIG. 15A

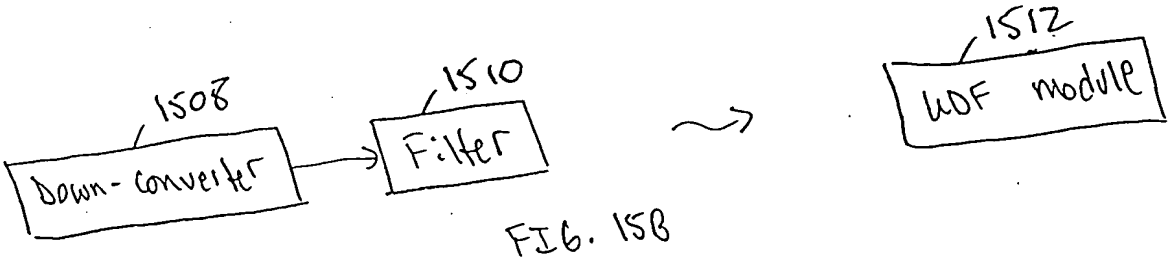


FIG. 15B

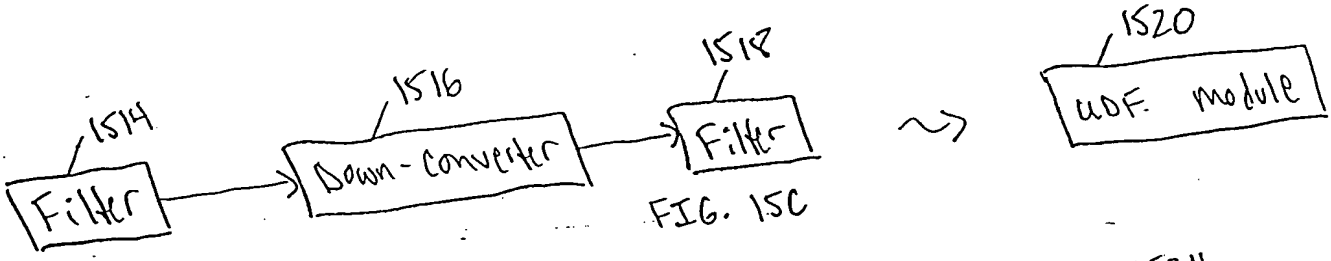


FIG. 15C

FIG. 15D

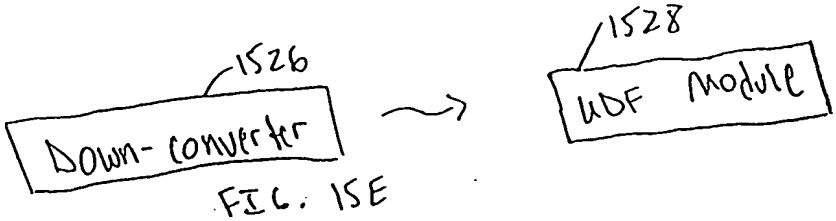


FIG. 15E

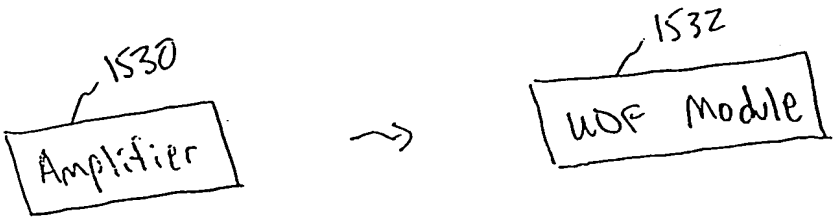


FIG. 15F

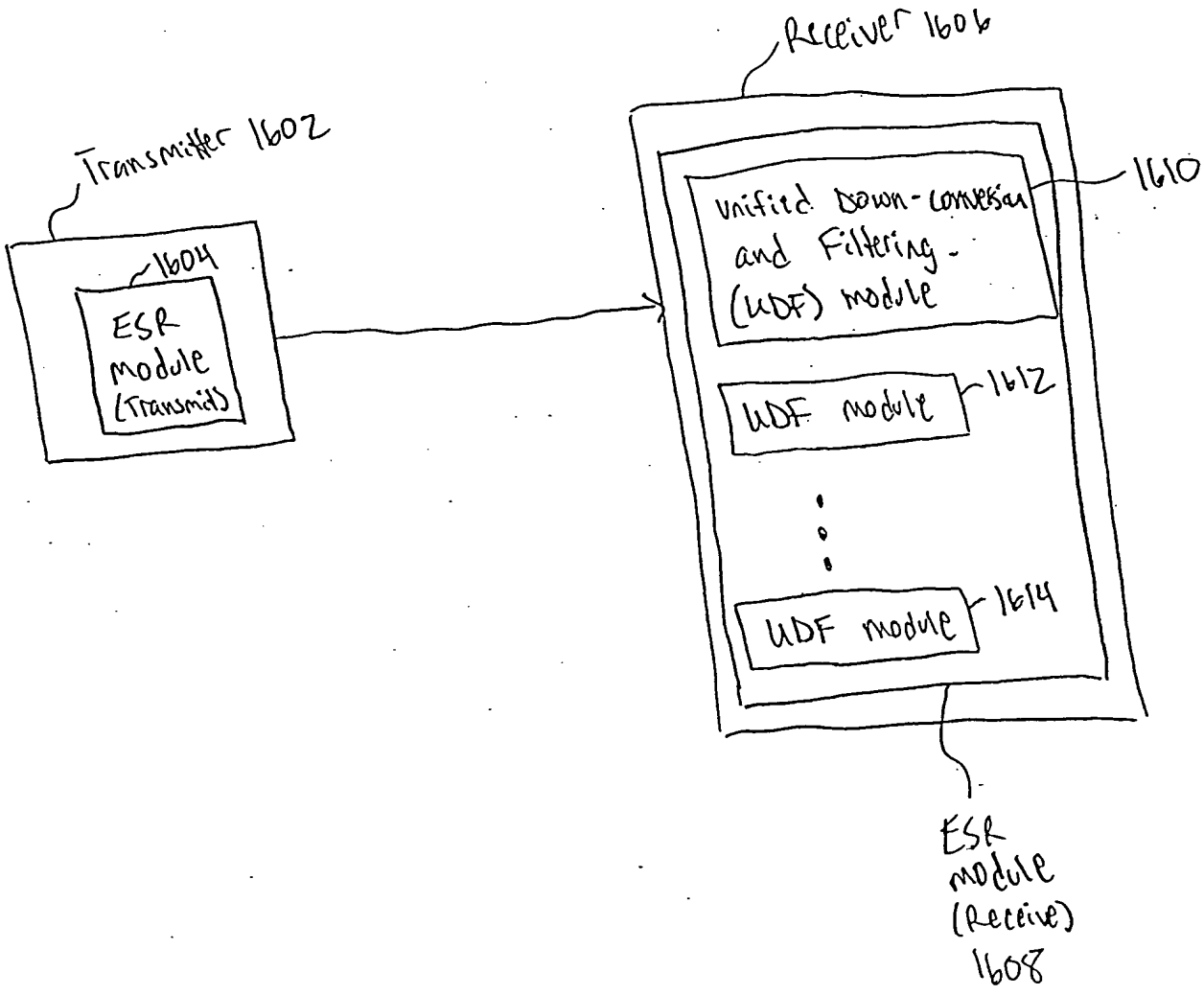

Receiver 1606
Transmitter 1602
1604
ESR module (Transmit)
Unified Down-conversion and Filtering (UDF) module
1610
UDF module
1612
UDF module
1614
ESR module (Receive) 1608

FIG. 16

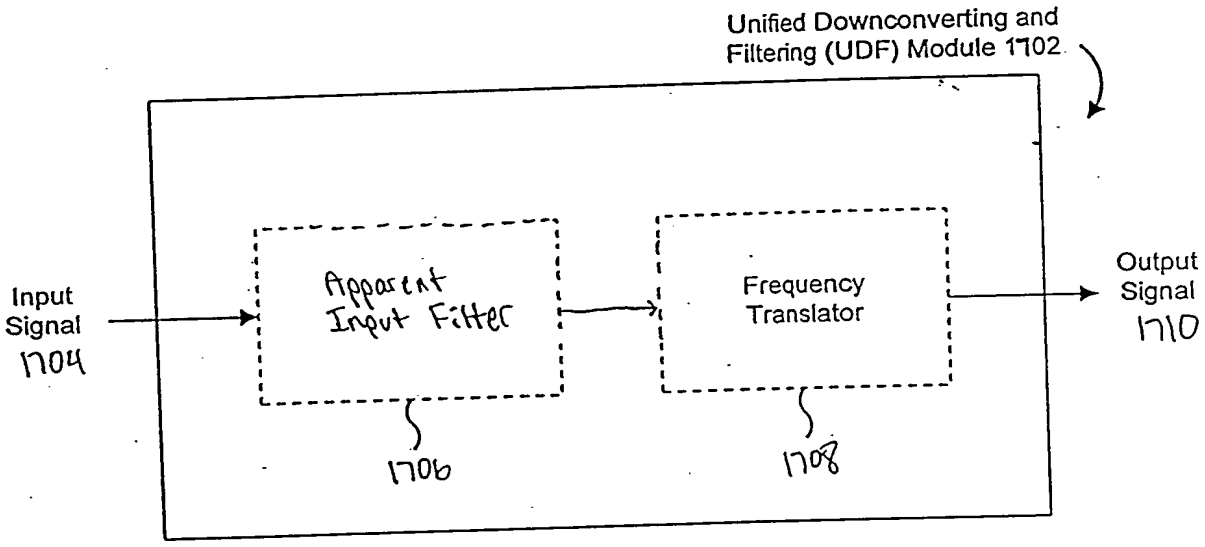


FIG. 17

9809-02.vsd/1

1802

Time / Node	t-1 (rising edge of ϕ_1)	t-1 (rising edge of ϕ_2)	t (rising edge of ϕ_1)	t (rising edge of ϕ_2)	t+1 (rising edge of ϕ_1)
1902	VI_{t-1} 1804	VI_{t-1} 1808	VI_t 1816	VI_t 1826	VI_{t+1} 1838
1904	—	VI_{t-1} 1810	VI_{t-1} 1818	VI_t 1828	VI_t 1840
1906	VO_{t-1} 1806	VO_{t-1} 1812	VO_t 1820	VO_t 1830	VO_{t+1} 1842
1908	—	VO_{t-1} 1814	VO_{t-1} 1822	VO_t 1832	VO_t 1844
1910	— 1807	—	VO_{t-1} 1824	VO_{t-1} 1834	VO_t 1846
1912	—	— 1815	—	VO_{t-1} 1836	VO_{t-1} 1848
1918	—	—	—	—	VI_t - 1850 $0.1 * VO_t - 0.8 * VO_{t-1}$

FIG. 18

9809-02.vsc

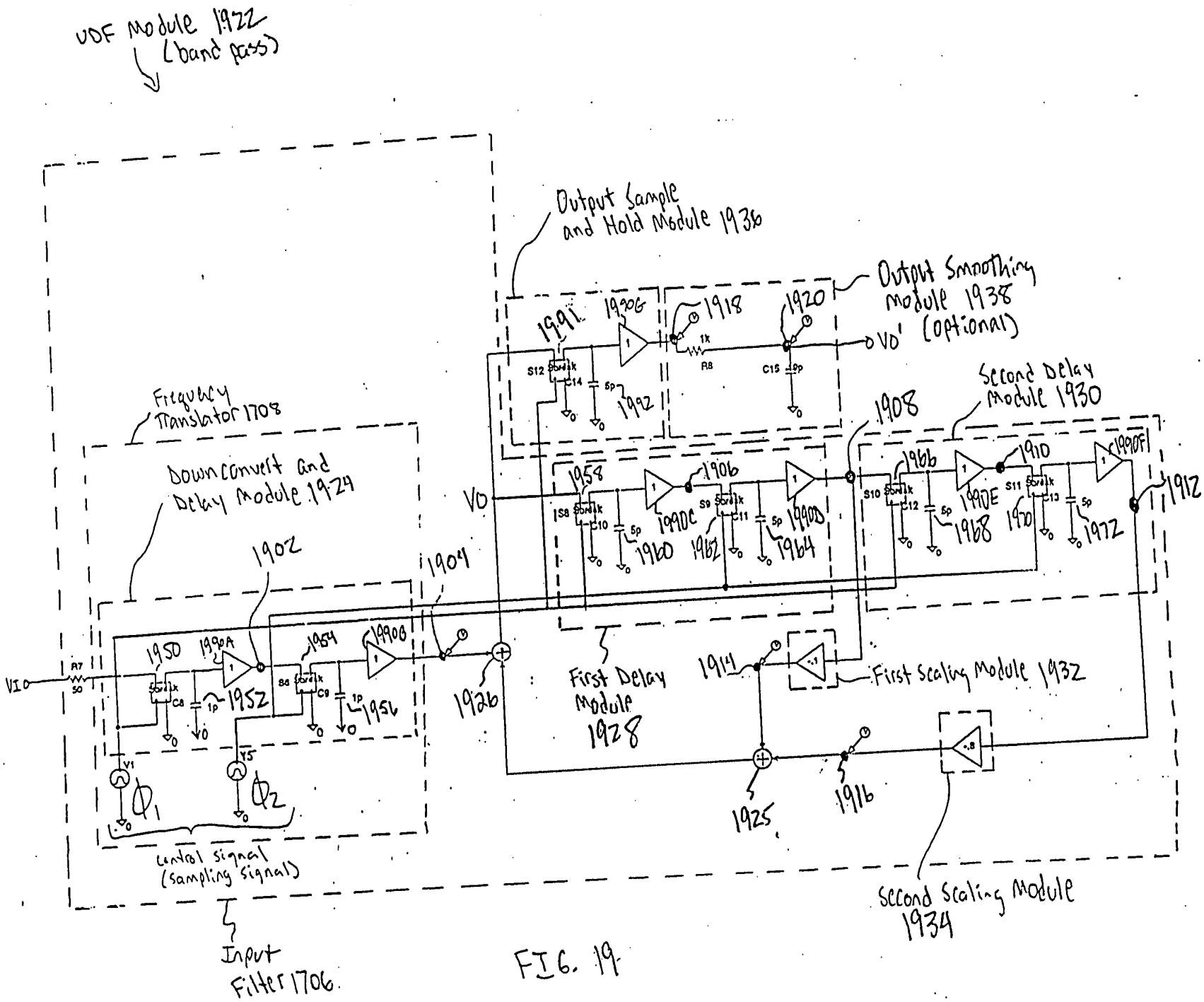

VDF Module 1922
(band pass)
Output Sample and Hold Module 1936
Output Smoothing Module 1938 (optional)
Vo' (optional)
Second Delay Module 1930
Frequency Translator 1708
Down convert and Delay Module 1929
1908
1902
1904
1912
Vo
Vi
First Delay Module 1928
First Scaling Module 1932
Second Scaling Module 1934
Input Filter 1706
control signal (sampling signal)
1926
1925
1916
1914
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1990A
1990B
1990C
1990D
1990E
1990F
1991
1992
1918
1920
R7
R8
C8
C9
C14
C15
S8
S9
S10
S11
S12
V1
V5
Q1
Q2

FIG. 19

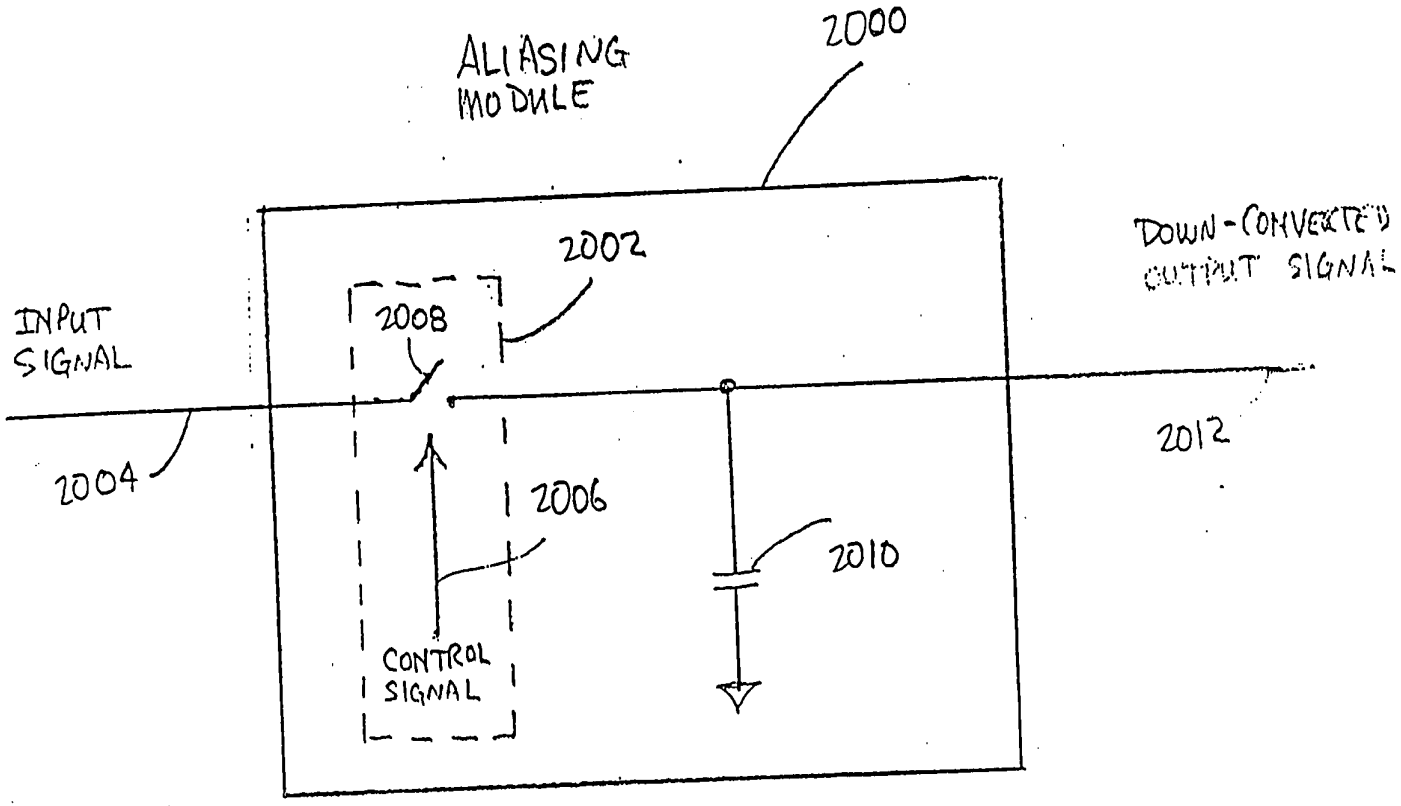


FIG. 20A

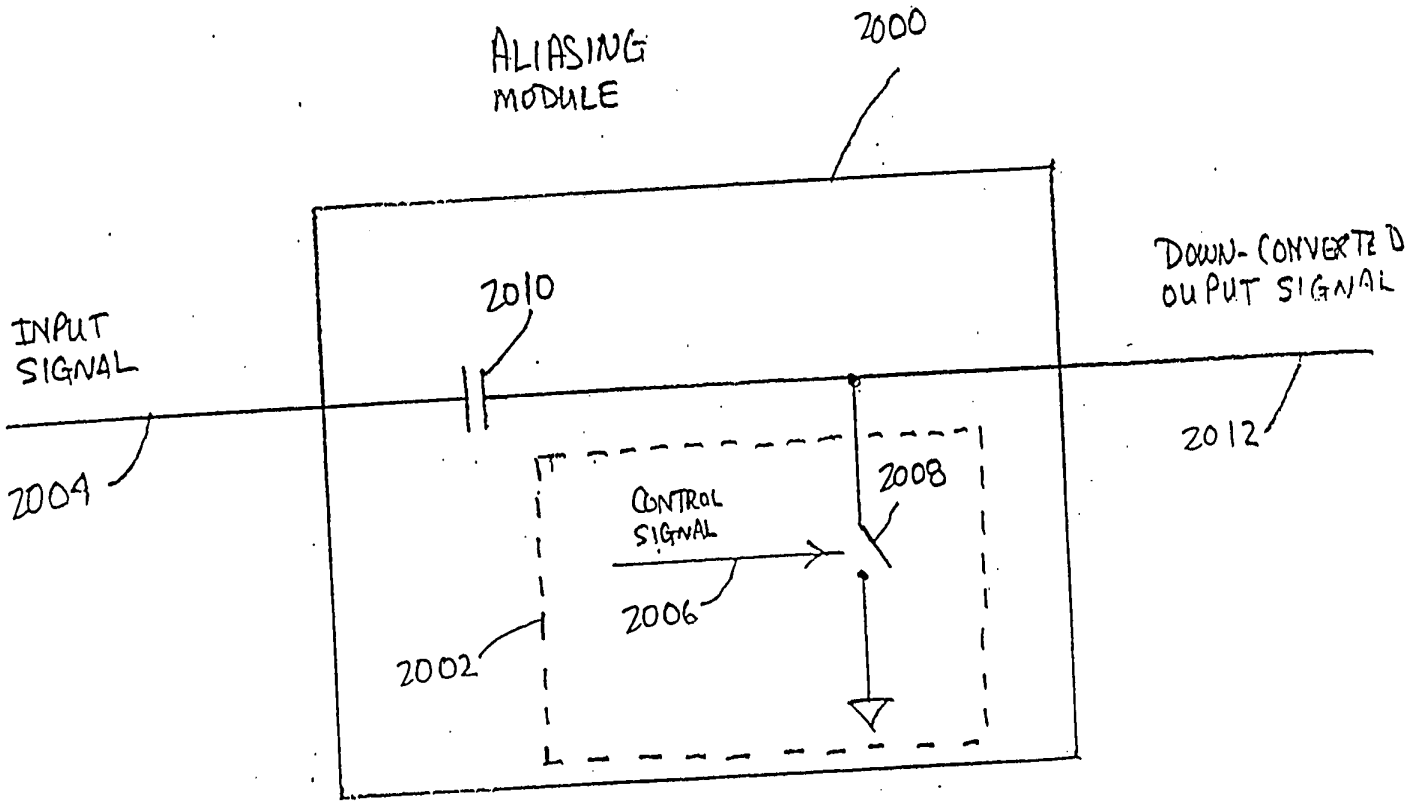


FIG. 20A-1

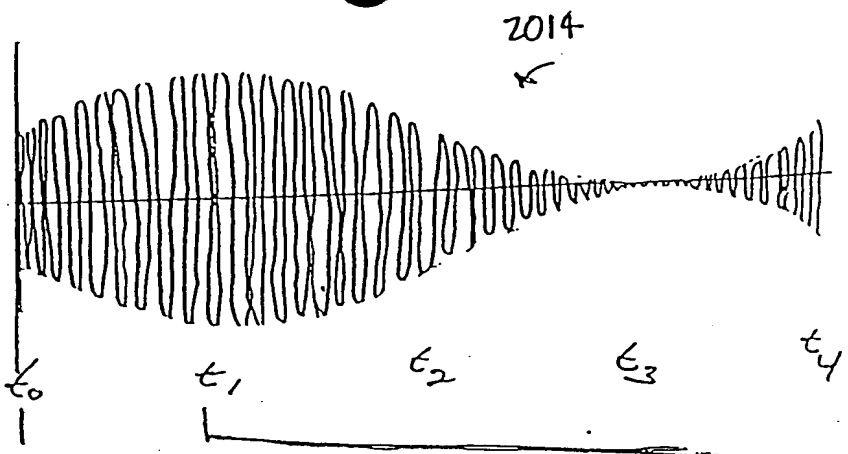


FIG. 20B

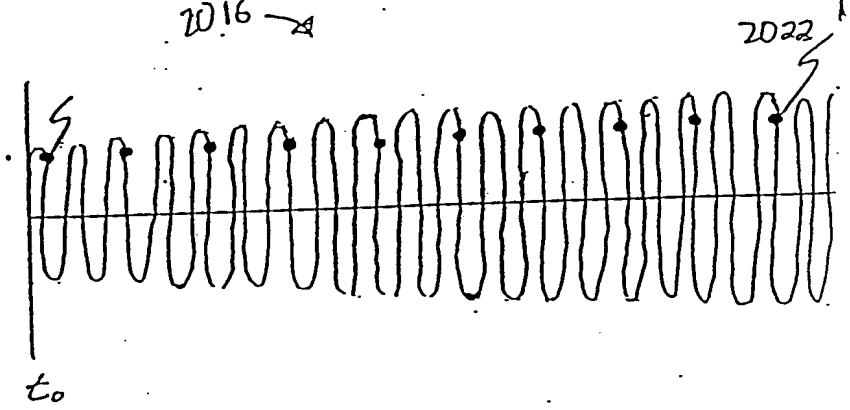


FIG. 20C

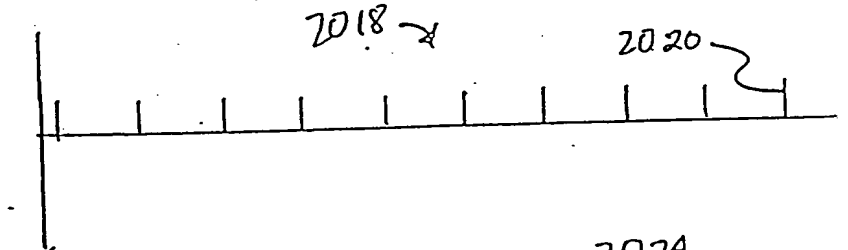


FIG. 20D

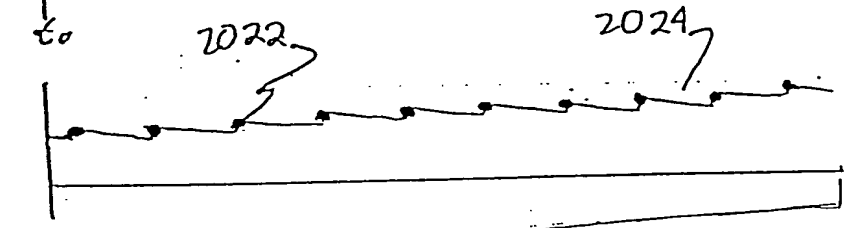


FIG. 20E

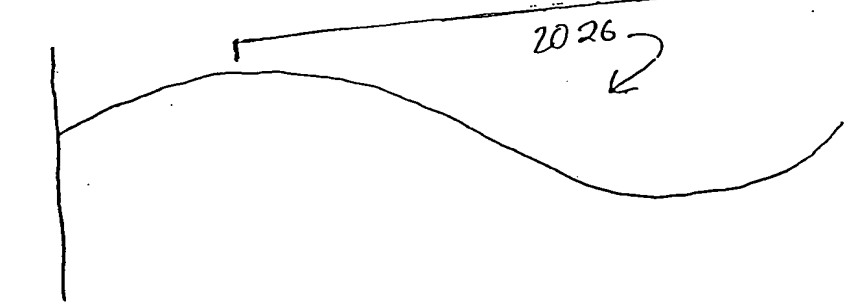


FIG. 20F

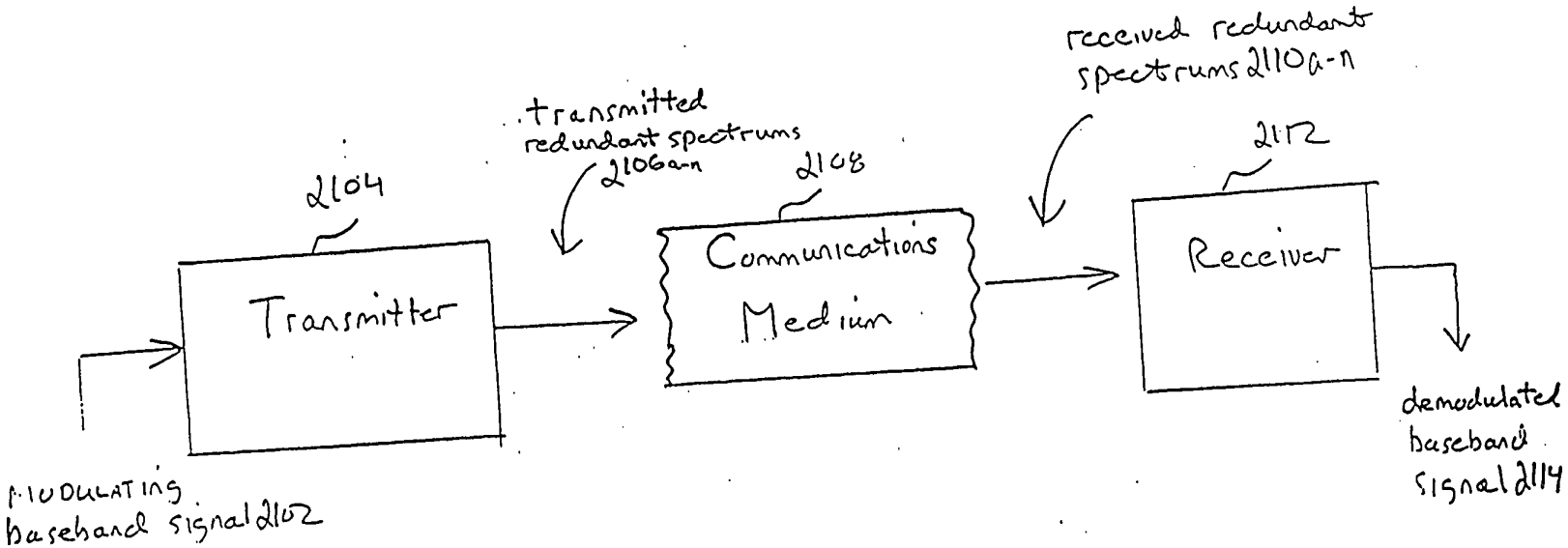

received redundant spectrums 2110a-n
transmitted redundant spectrums 2106a-n
2112
2104
2108
Communications Medium
Transmitter
Receiver
demodulated baseband signal 2114
MODULATING baseband signal 2102

FIG. 21

FIG. 22A

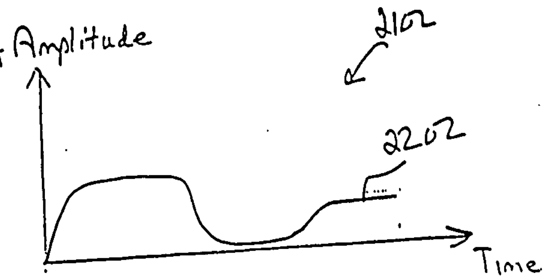


FIG. 22B

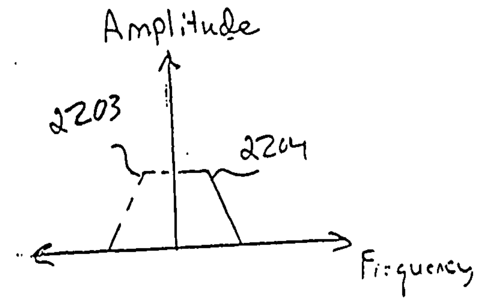


FIG. 22C

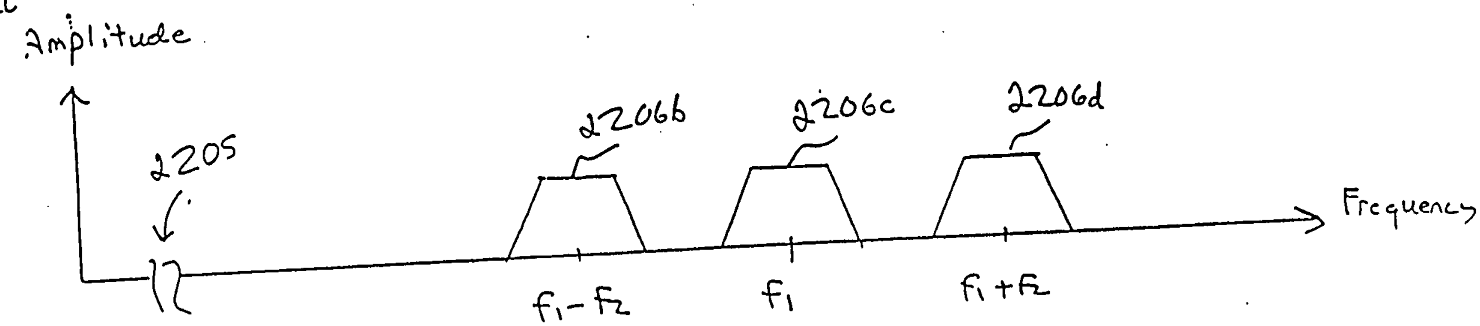
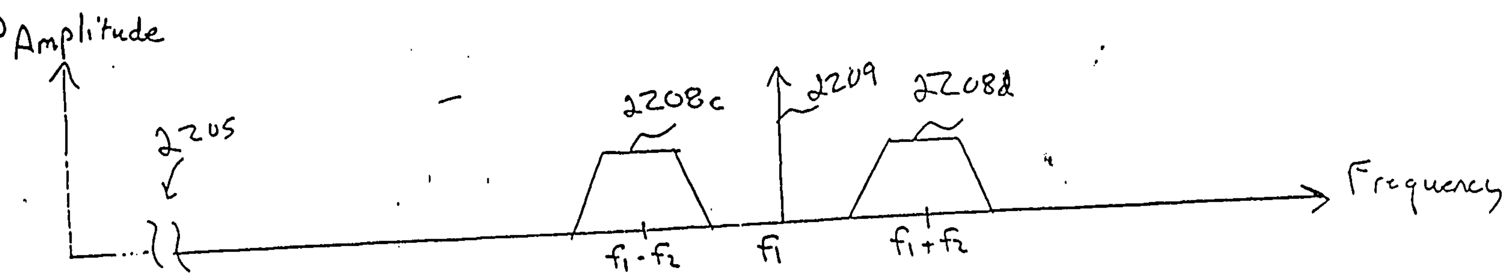


FIG. 22D



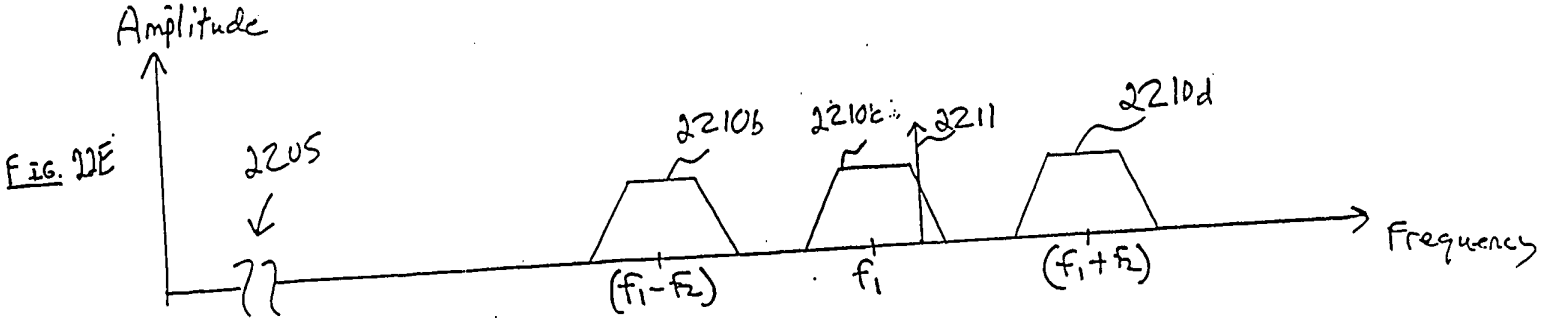


FIG. 22E

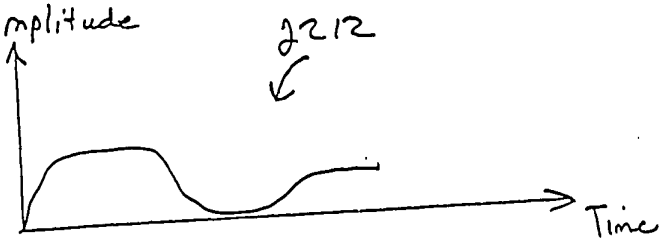


FIG. 22F

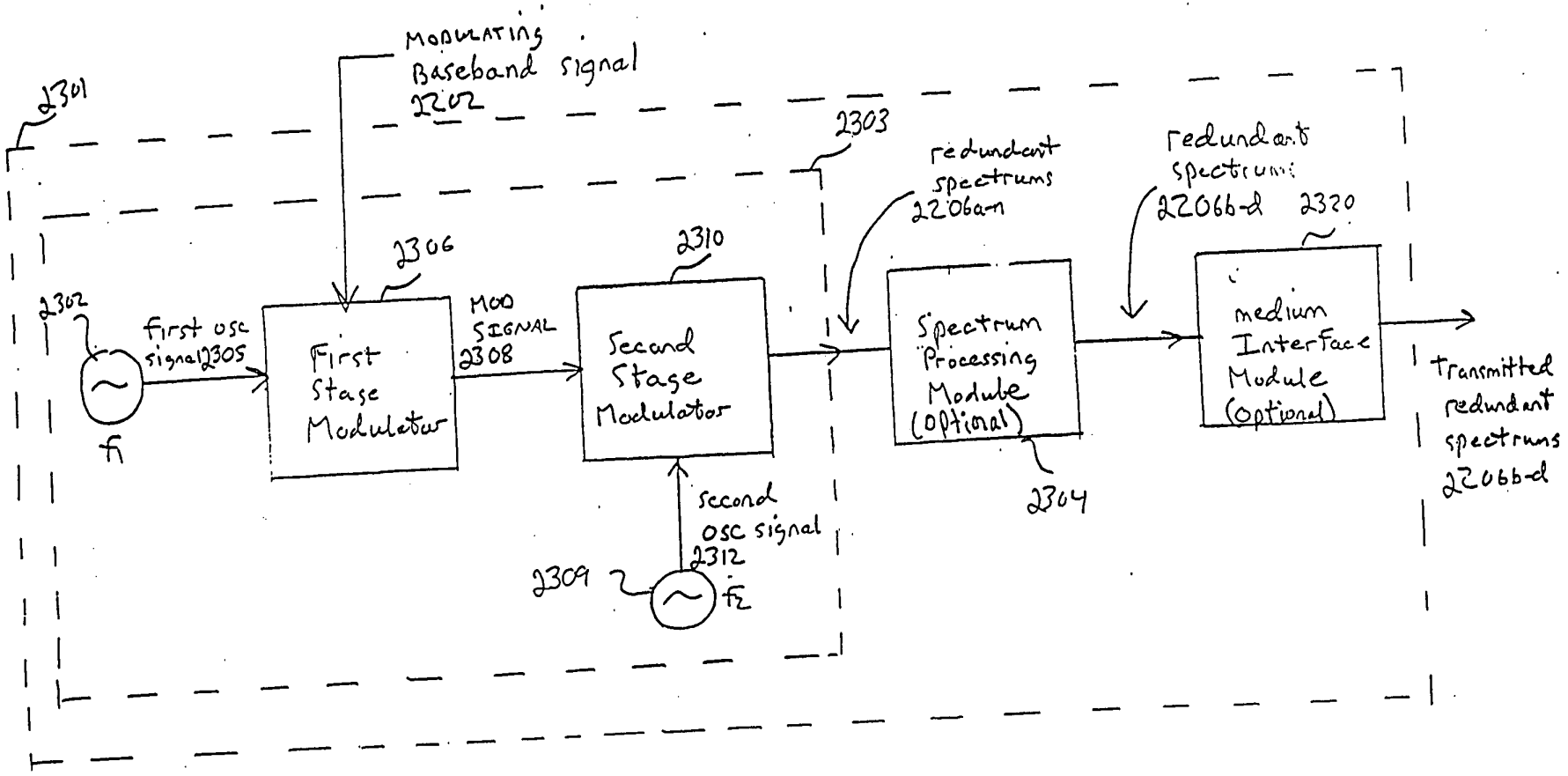

2301
Modulating Baseband signal 2202
2303
redundant spectrums 2206a-n
Redundant spectrums 2206b-d
2320
2306
2310
2302
first osc signal 2305
First Stage Modulator
MOD SIGNAL 2308
Second Stage Modulator
Spectrum Processing Module (optional)
medium Interface Module (optional)
Transmitted redundant spectrums 2206b-d
2304
second osc signal 2312
2309
f1
f2

FIG. 23A

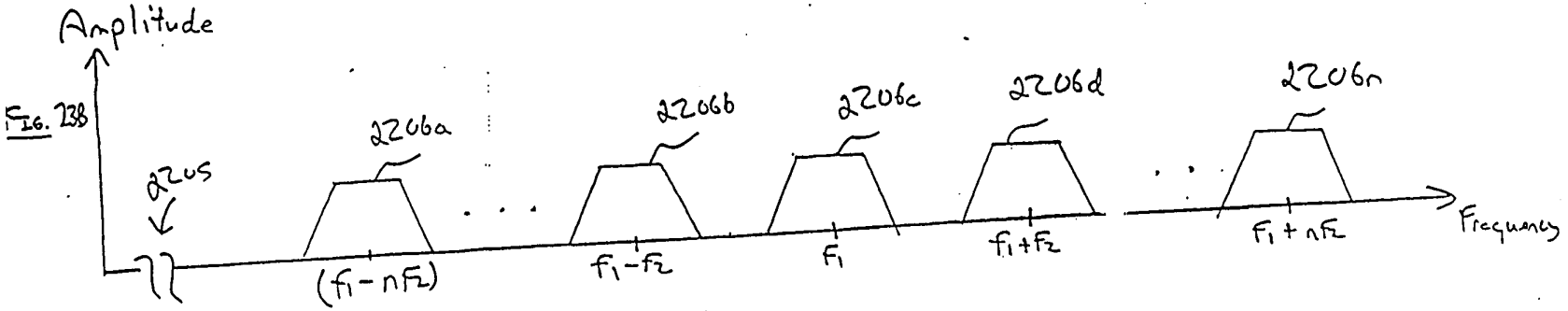


FIG. 23B

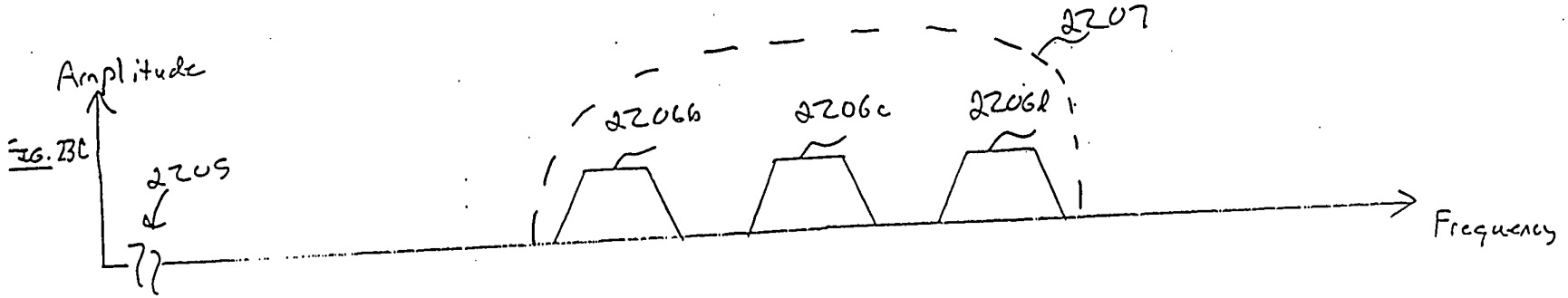


FIG. 23C

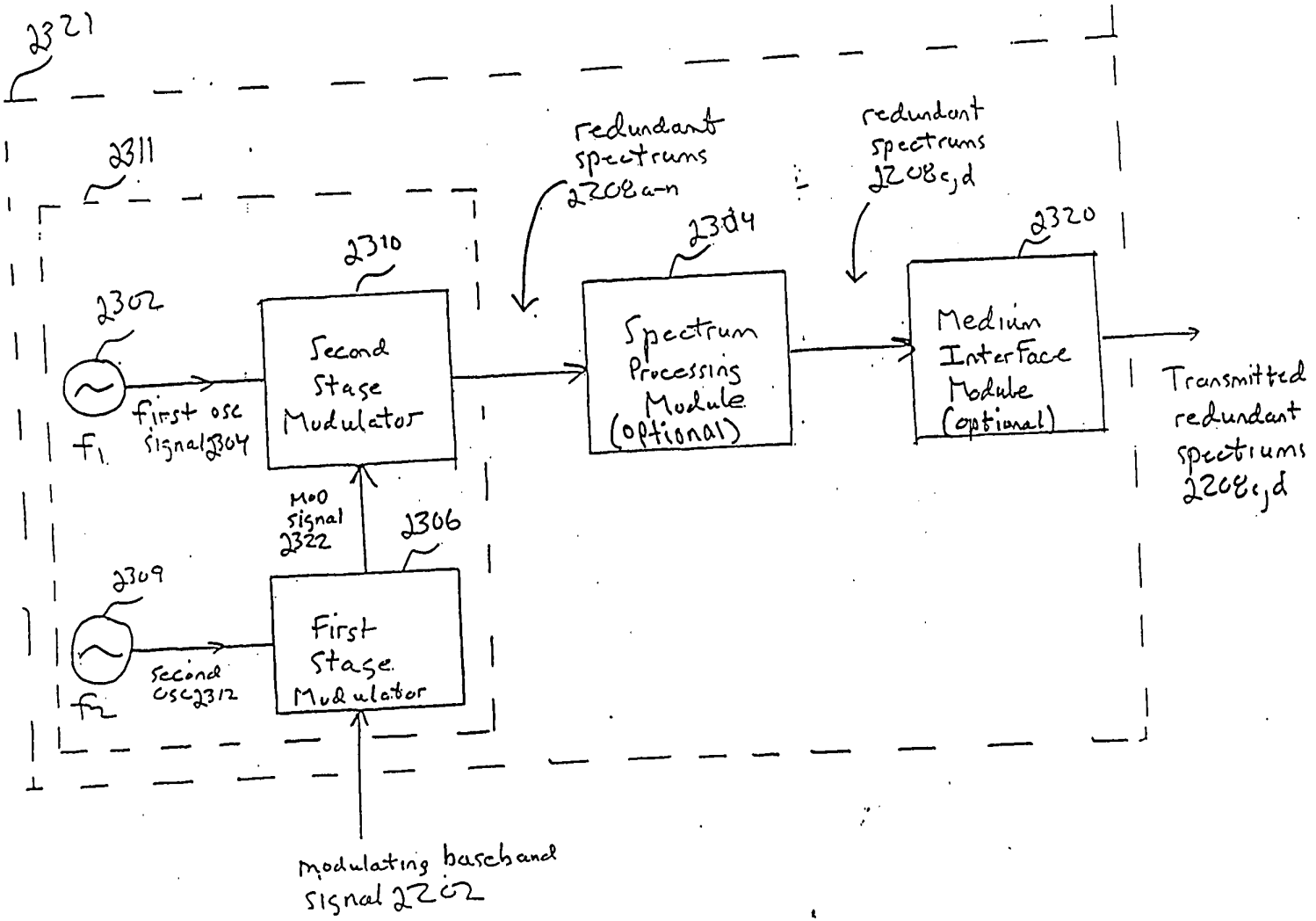

2321
2311
redundant spectrums 2208a-n
redundant spectrums 2208c,d
2304
2320
2310
2302
Second Stage Modulator
Spectrum Processing Module (optional)
Medium Interface Module (optional)
Transmitted redundant spectrums 2208c,d
first osc signal 2304
f_1
MOD signal 2322
2306
2309
First Stage Modulator
second OSC 2312
f_2
Modulating baseband signal 2202

FIG. 23D

FIG. 23E

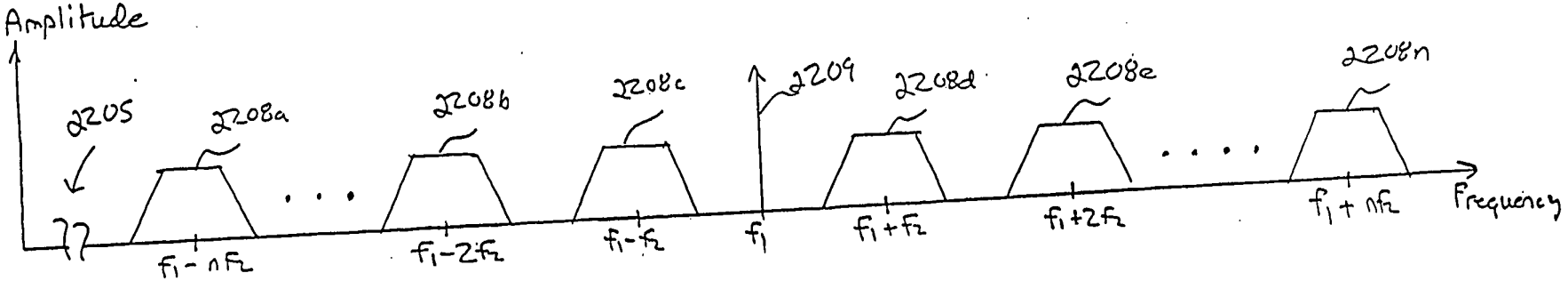
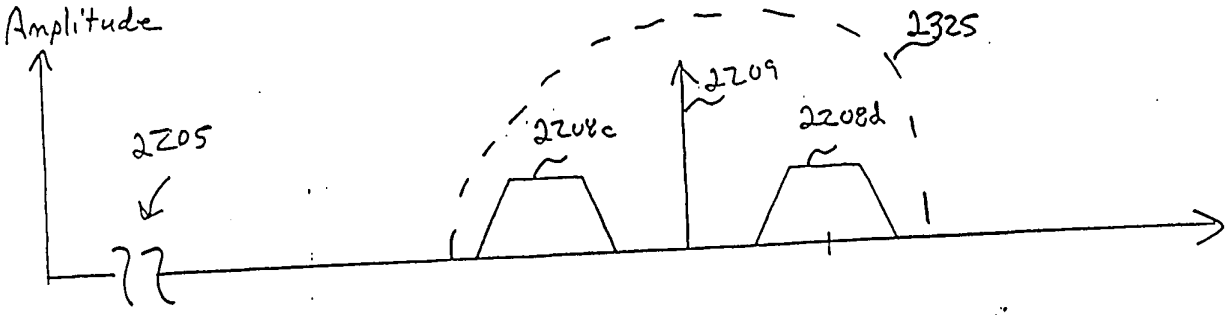


FIG. 23F



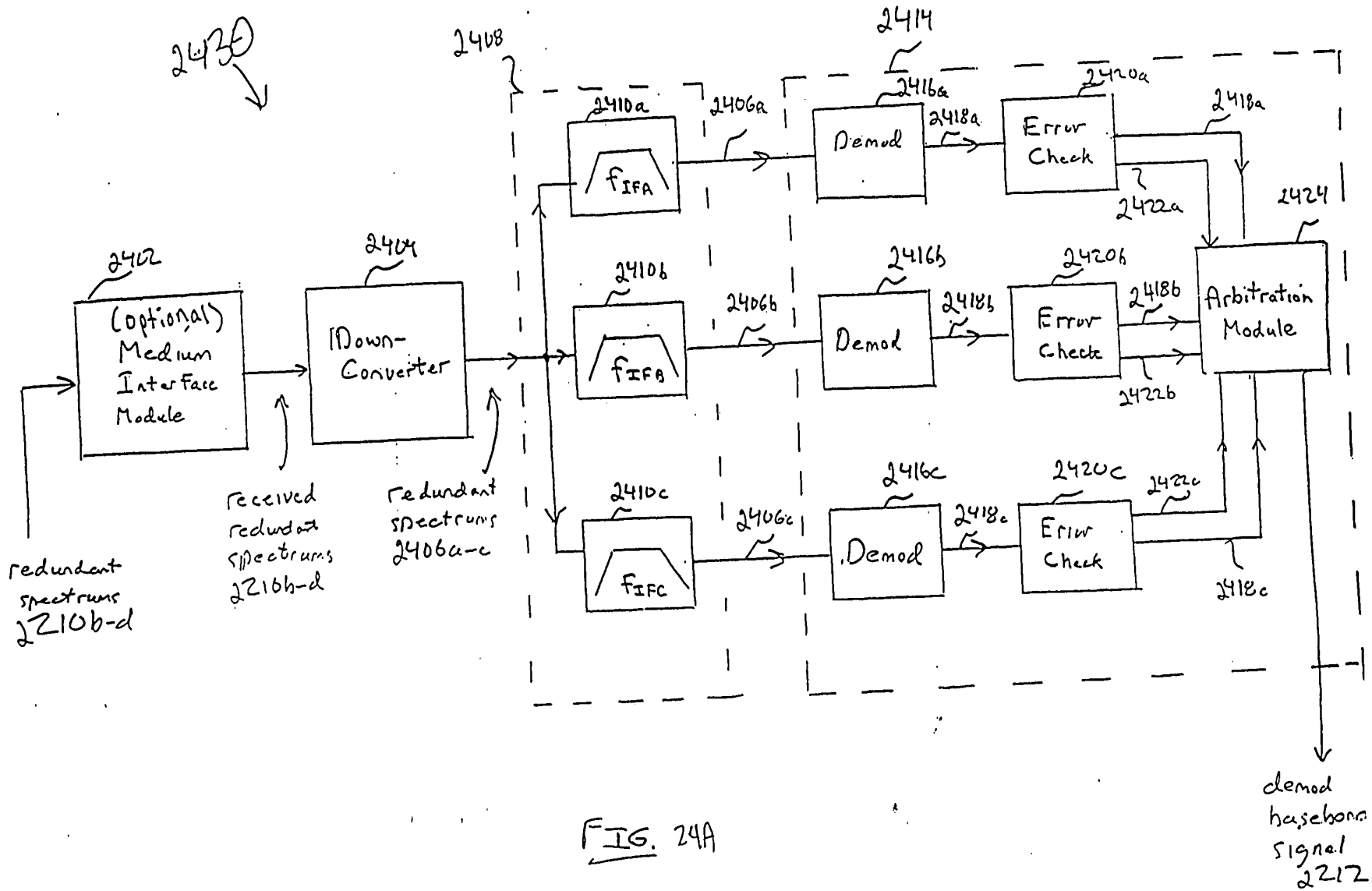

2430
2408
2414
2410a
2406a
2416a
2418a
2420a
2422a
2424
2402
2404
2410b
2406b
2416b
2418b
2420b
2422b
Arbitration Module
(optional) Medium Interface Module
Down-Converter
2410c
2406c
2416c
2418c
2420c
2422c
f_{IFA}
f_{IFB}
f_{IFC}
Demod
Error Check
redundant spectrums 2210b-d
received redundant spectrums 2210b-d
redundant spectrums 2406a-c
demod baseband signal 2212

FIG. 24A

Made in U.S.A.

FIG. 24B

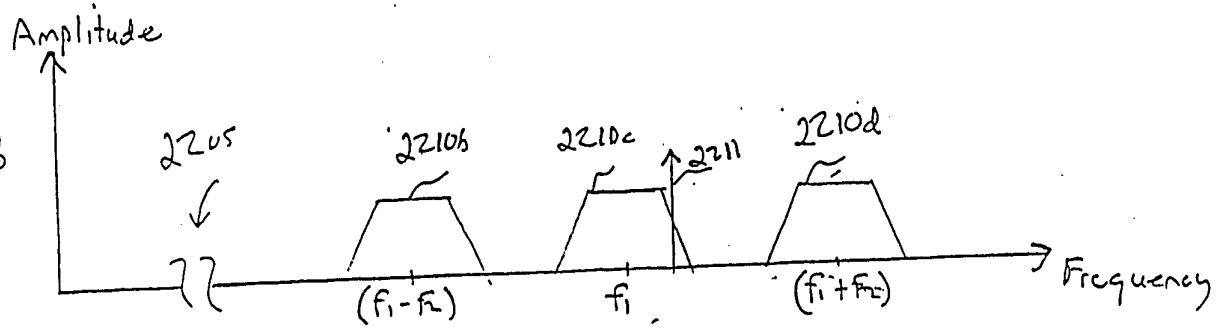
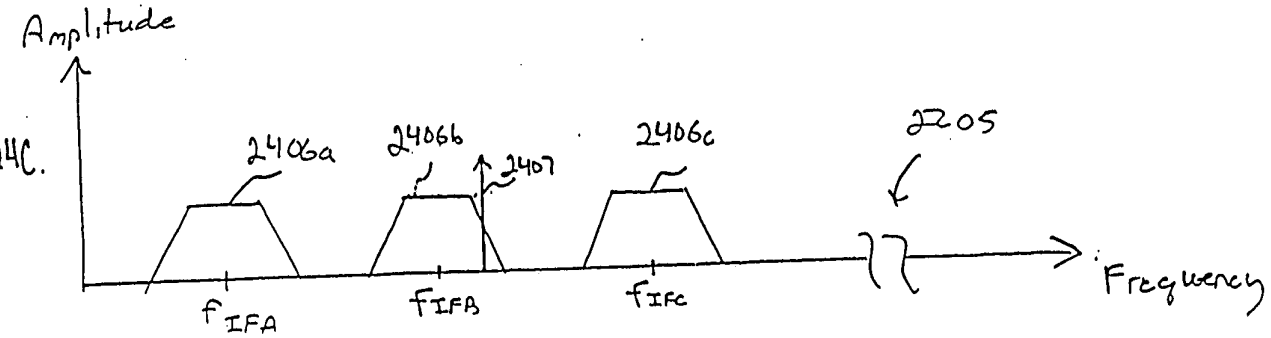


FIG. 24C.



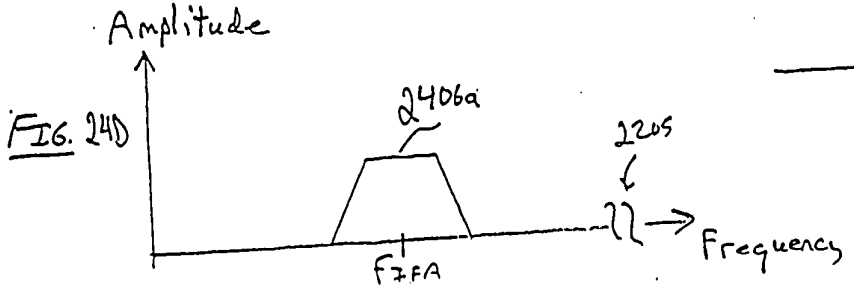


FIG. 24D

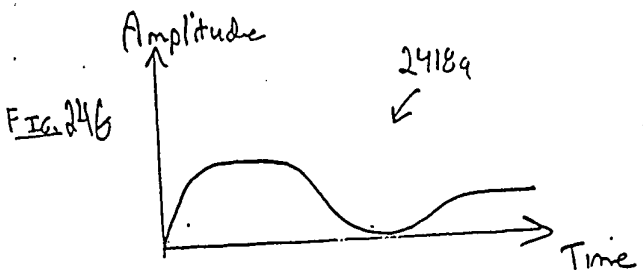


FIG. 24G

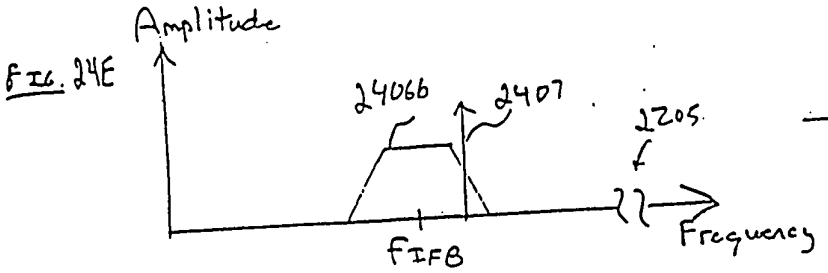


FIG. 24E

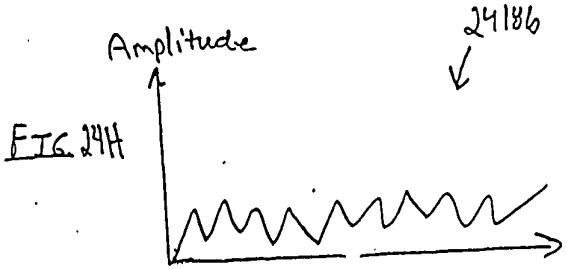


FIG. 24H

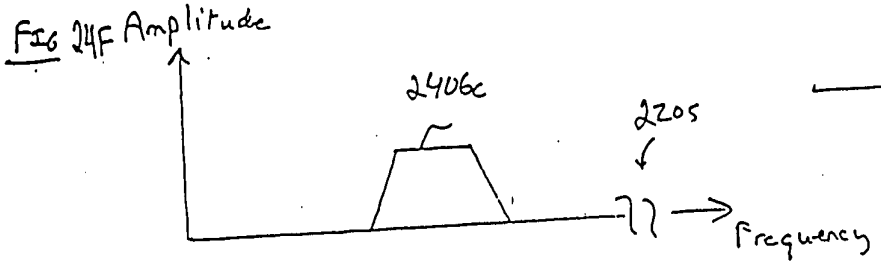


FIG 24F

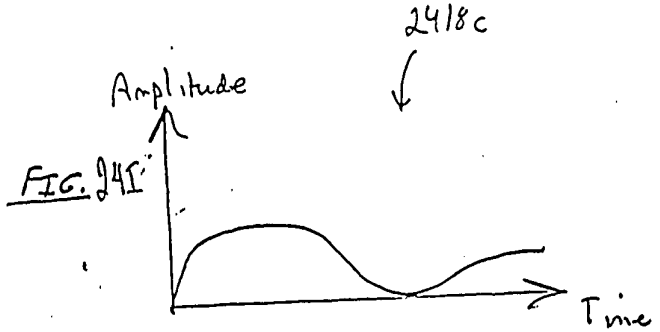


FIG. 24I

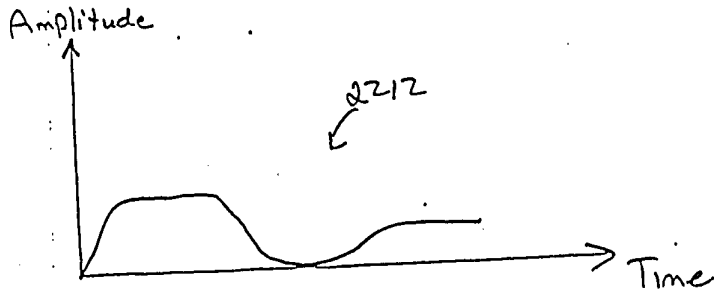


FIG. 24J

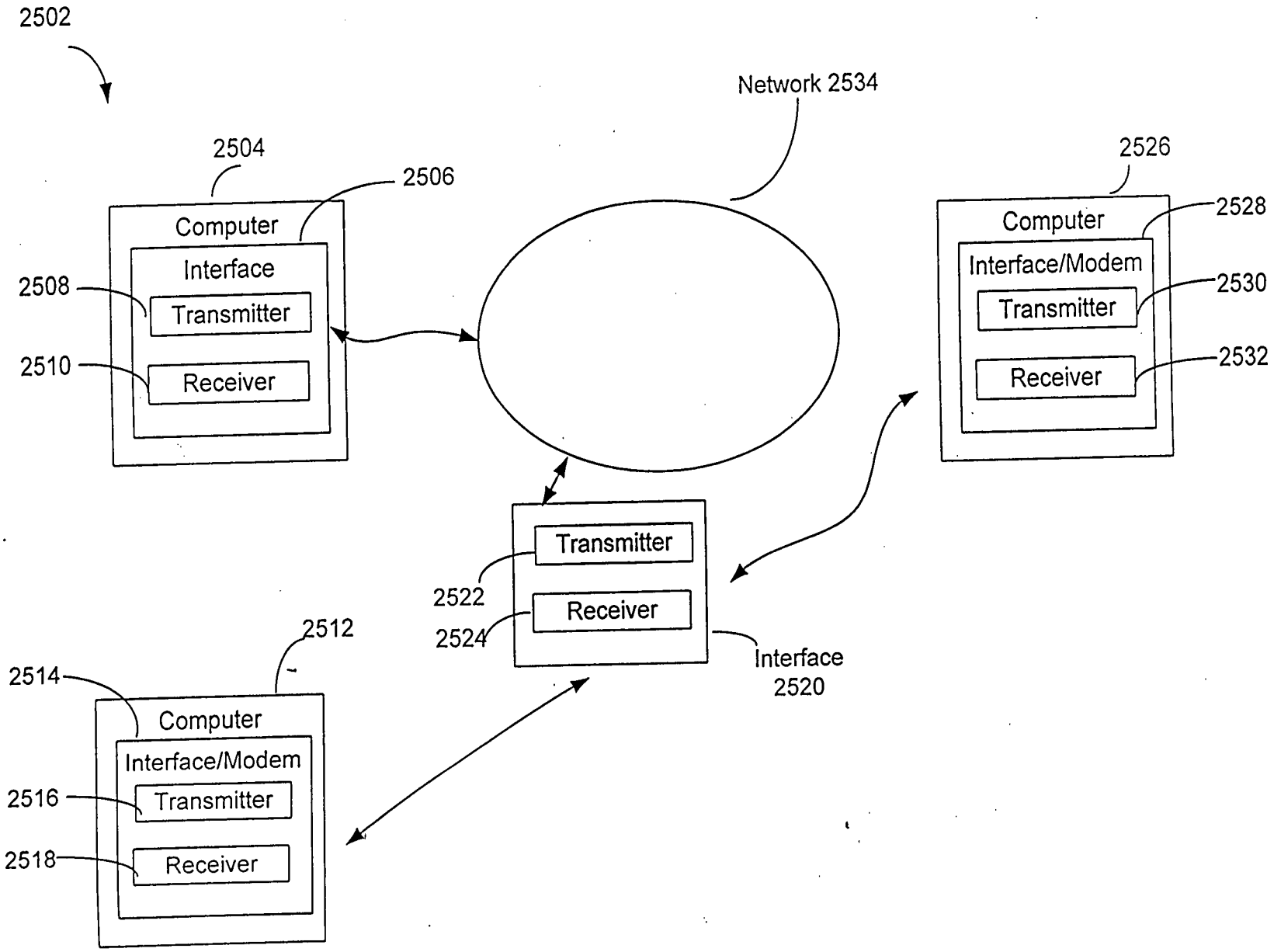

2502
Network 2534
2504
2506
Computer
Interface
2508
Transmitter
2510
Receiver
2526
Computer
Interface/Modem
2528
2530
Transmitter
2532
Receiver
Transmitter
2522
Receiver
2524
Interface
2520
2512
2514
Computer
Interface/Modem
2516
Transmitter
2518
Receiver

FIG. 25

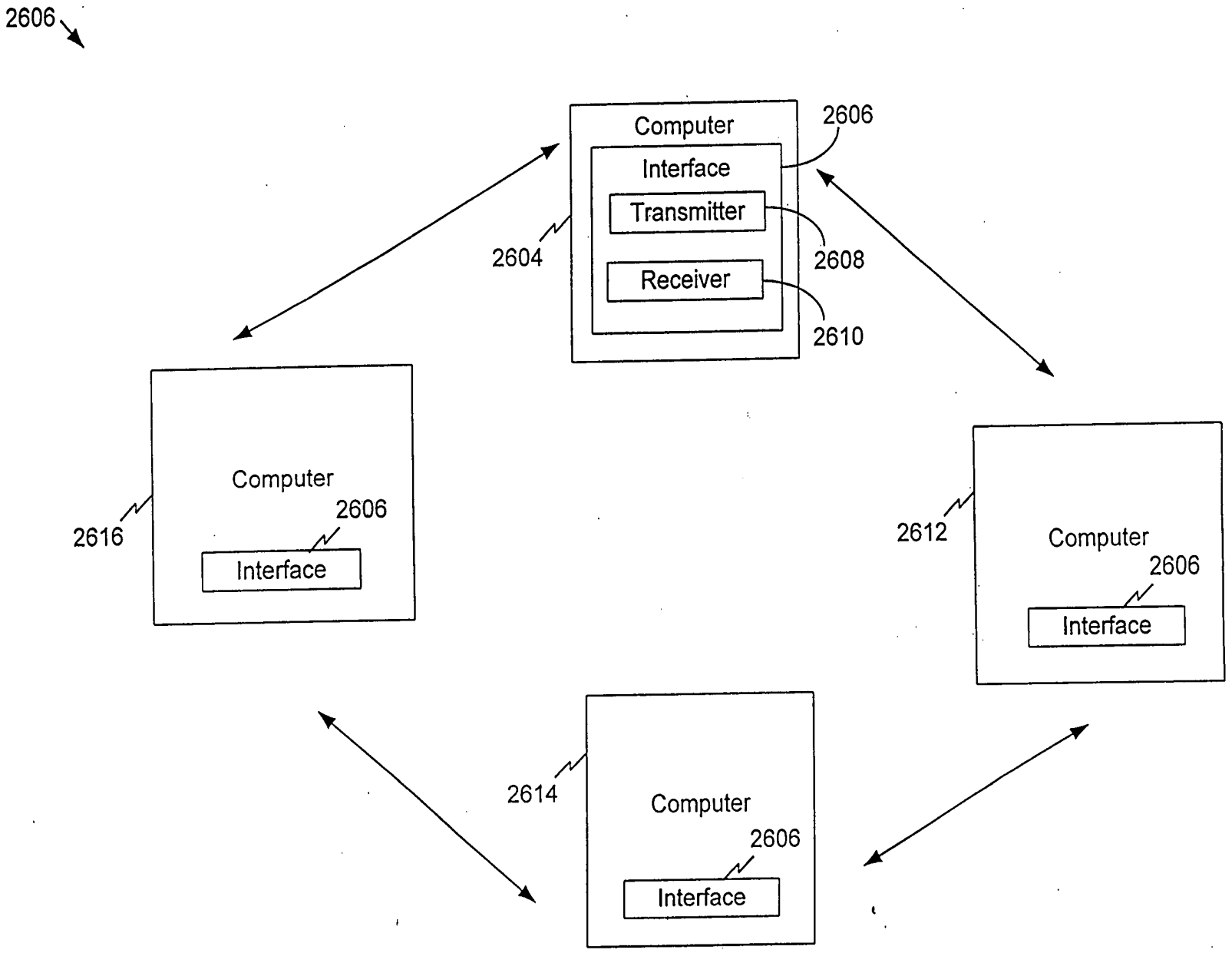

2606
Computer
Interface
Transmitter
Receiver
2606
2604
2608
2610
Computer
2606
Interface
2616
Computer
2606
Interface
2612
Computer
2606
Interface
2614

FIG. 26

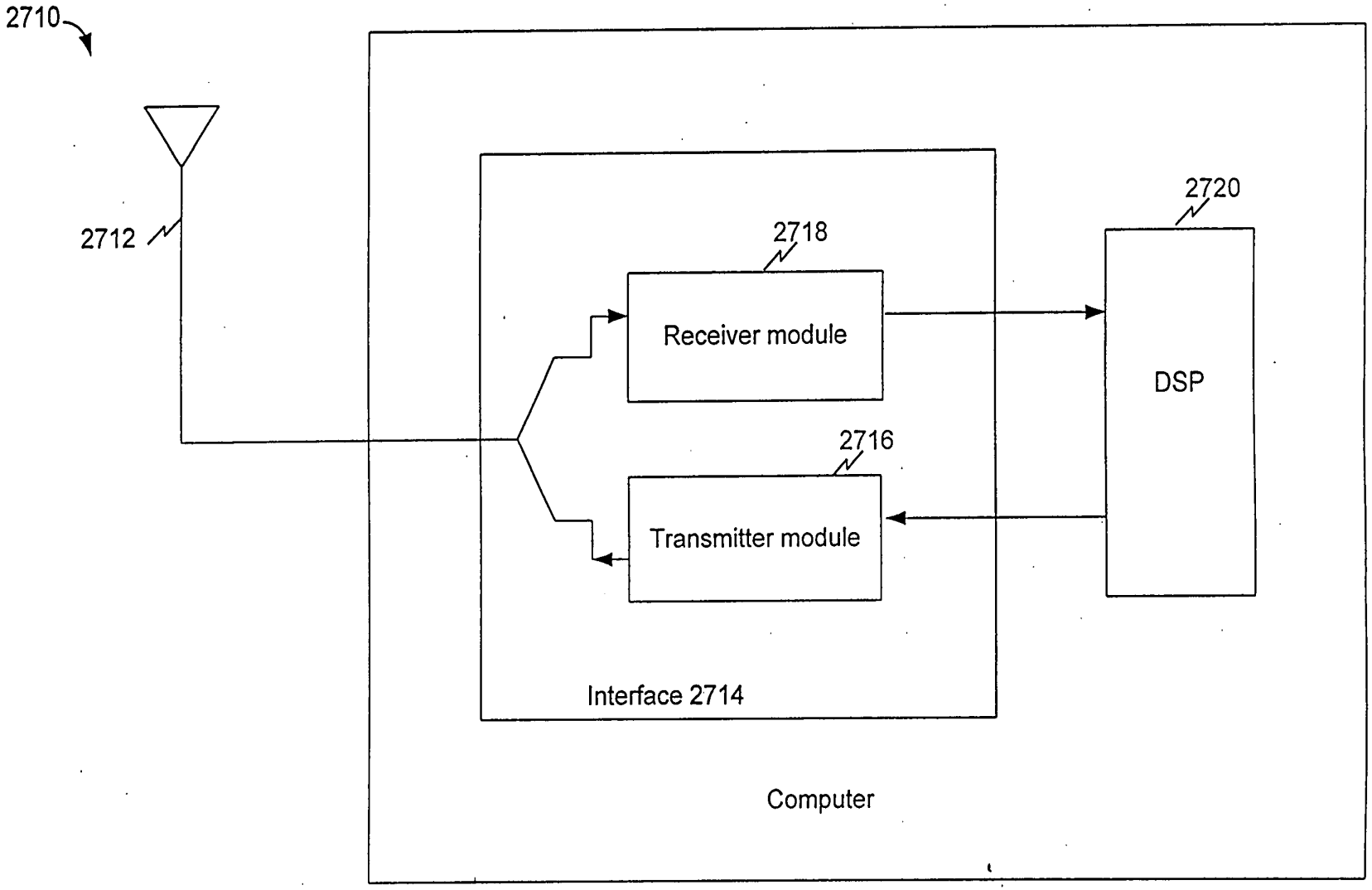
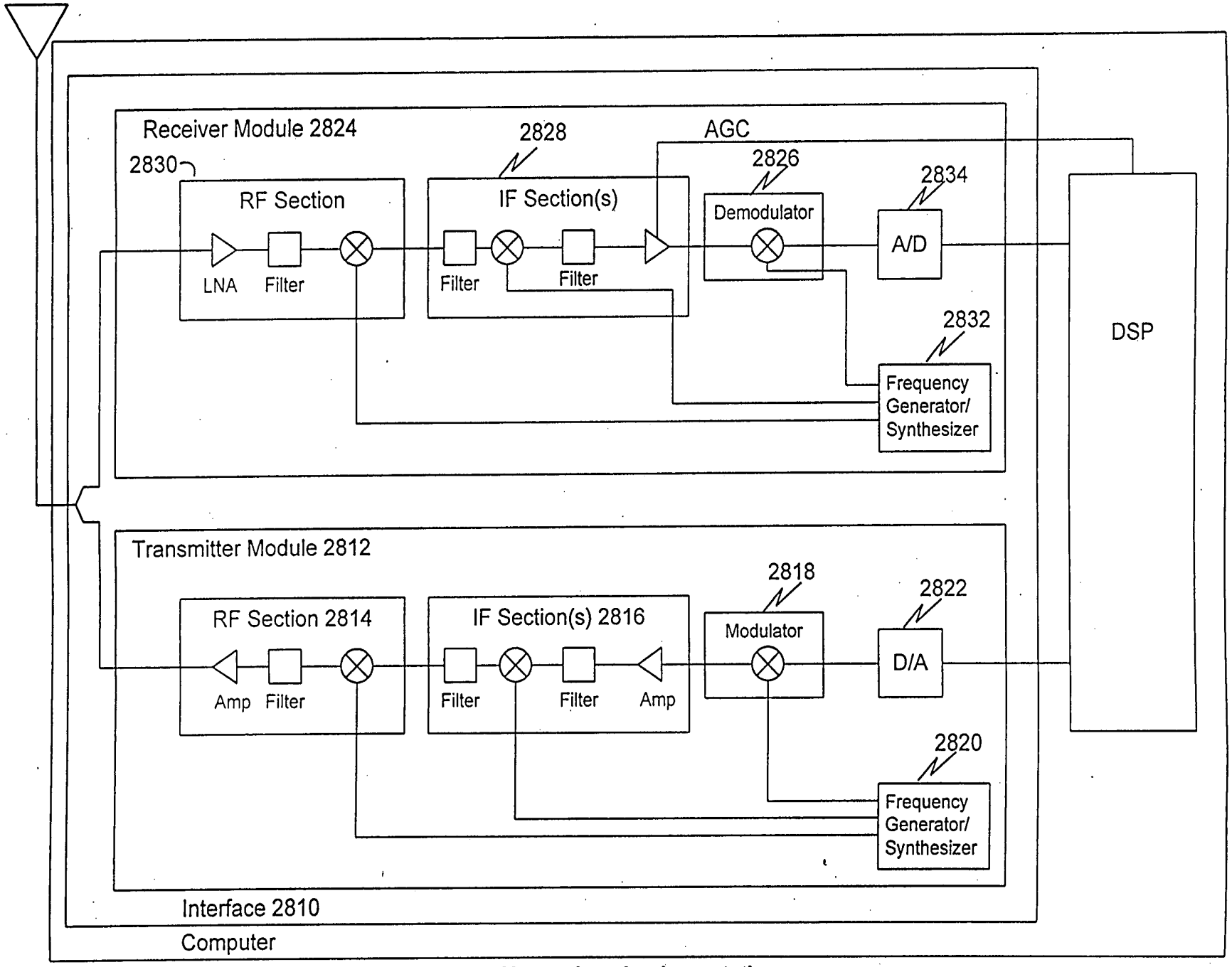


FIG. 27



Heterodyne Implementation

FIG. 28

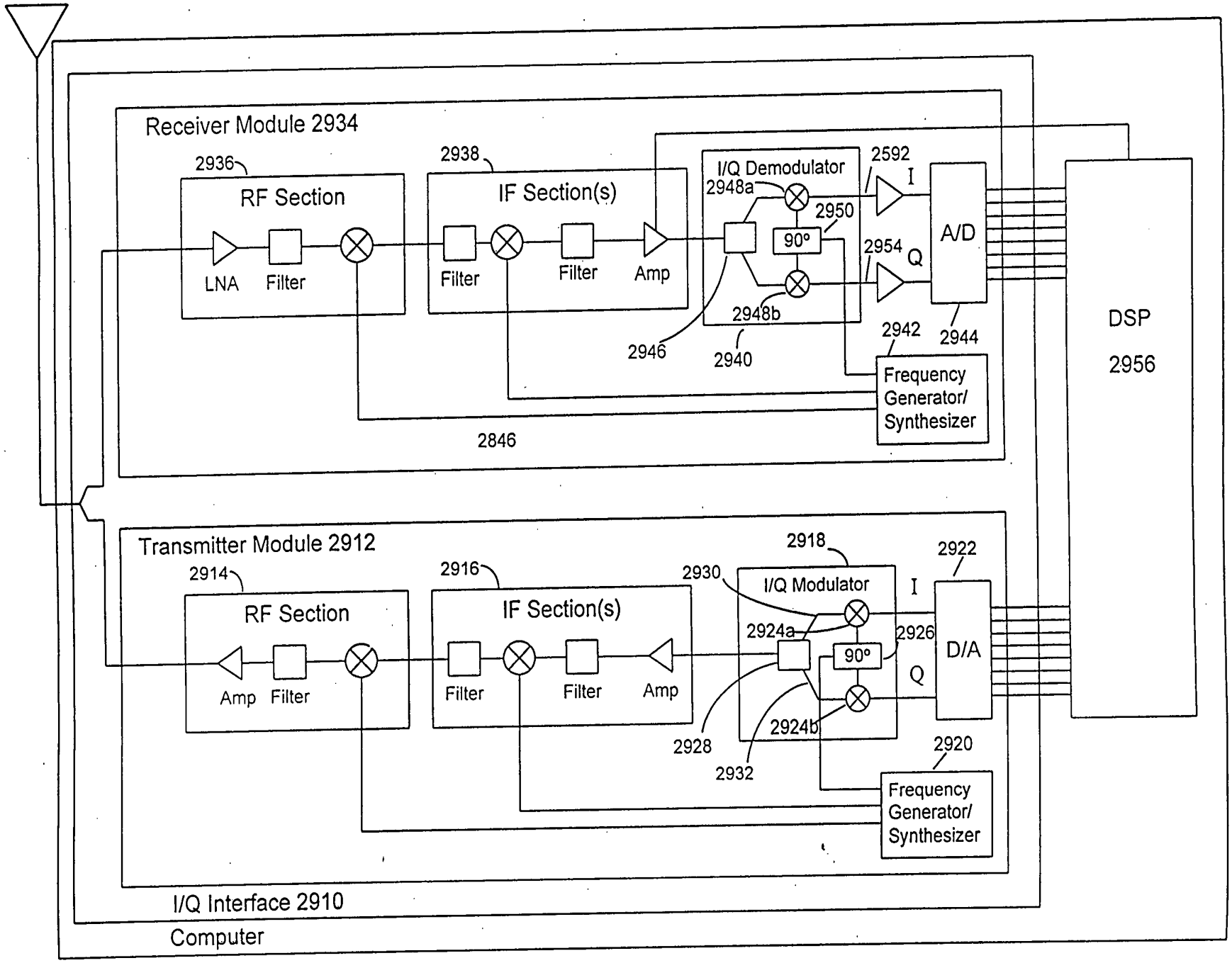


FIG. 29

9905-02.vsd/3

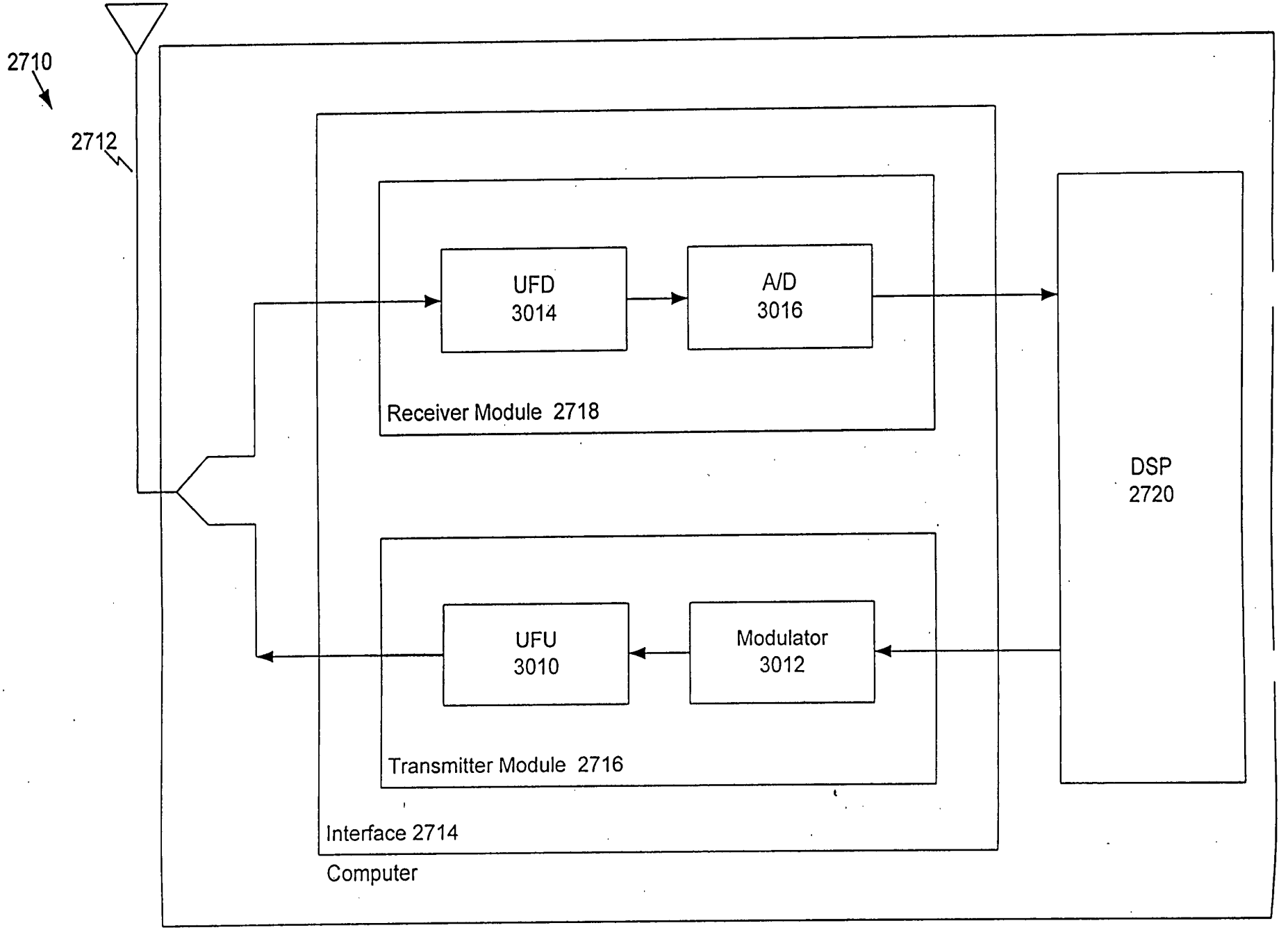


FIG. 30

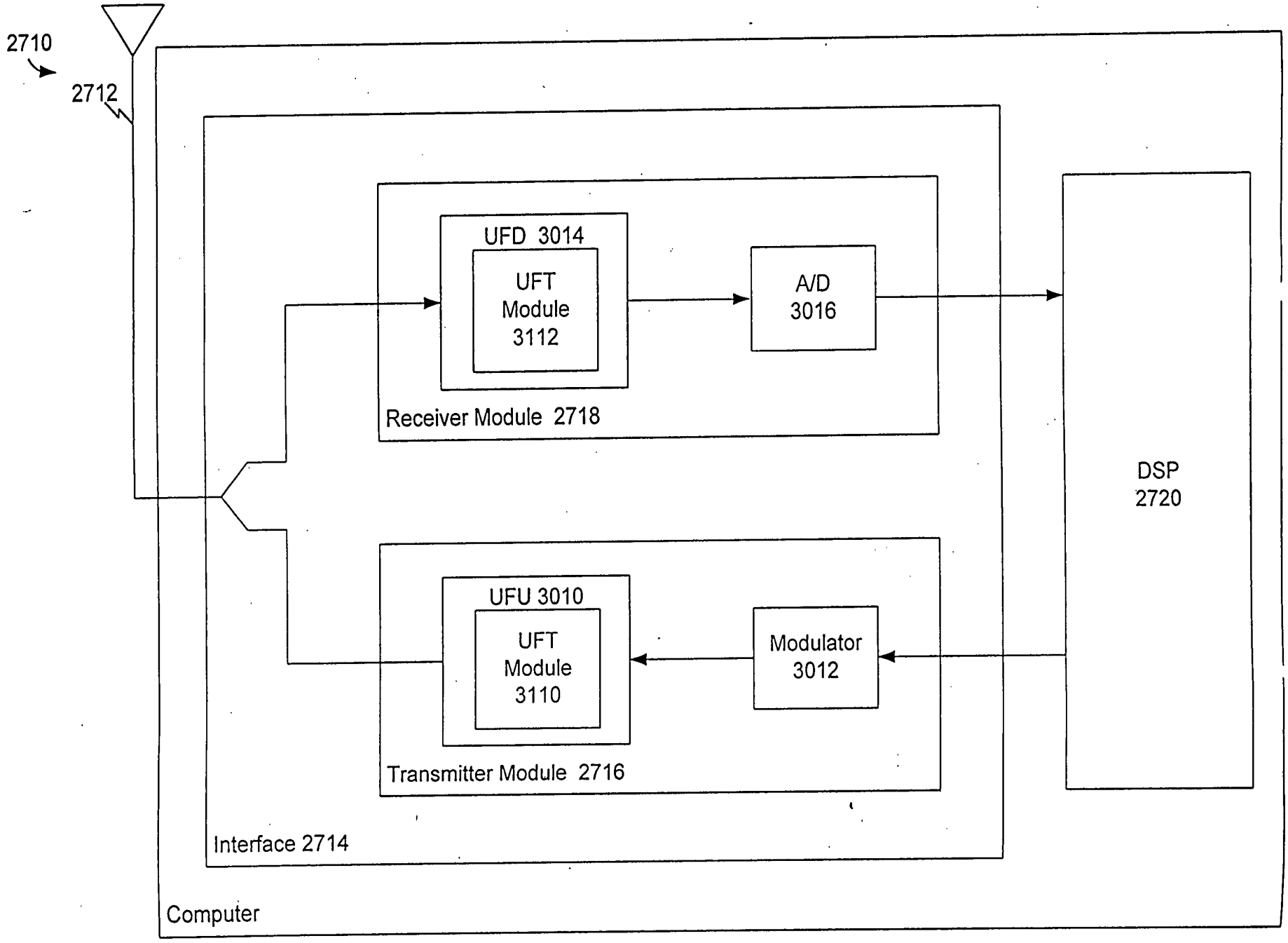


FIG. 31

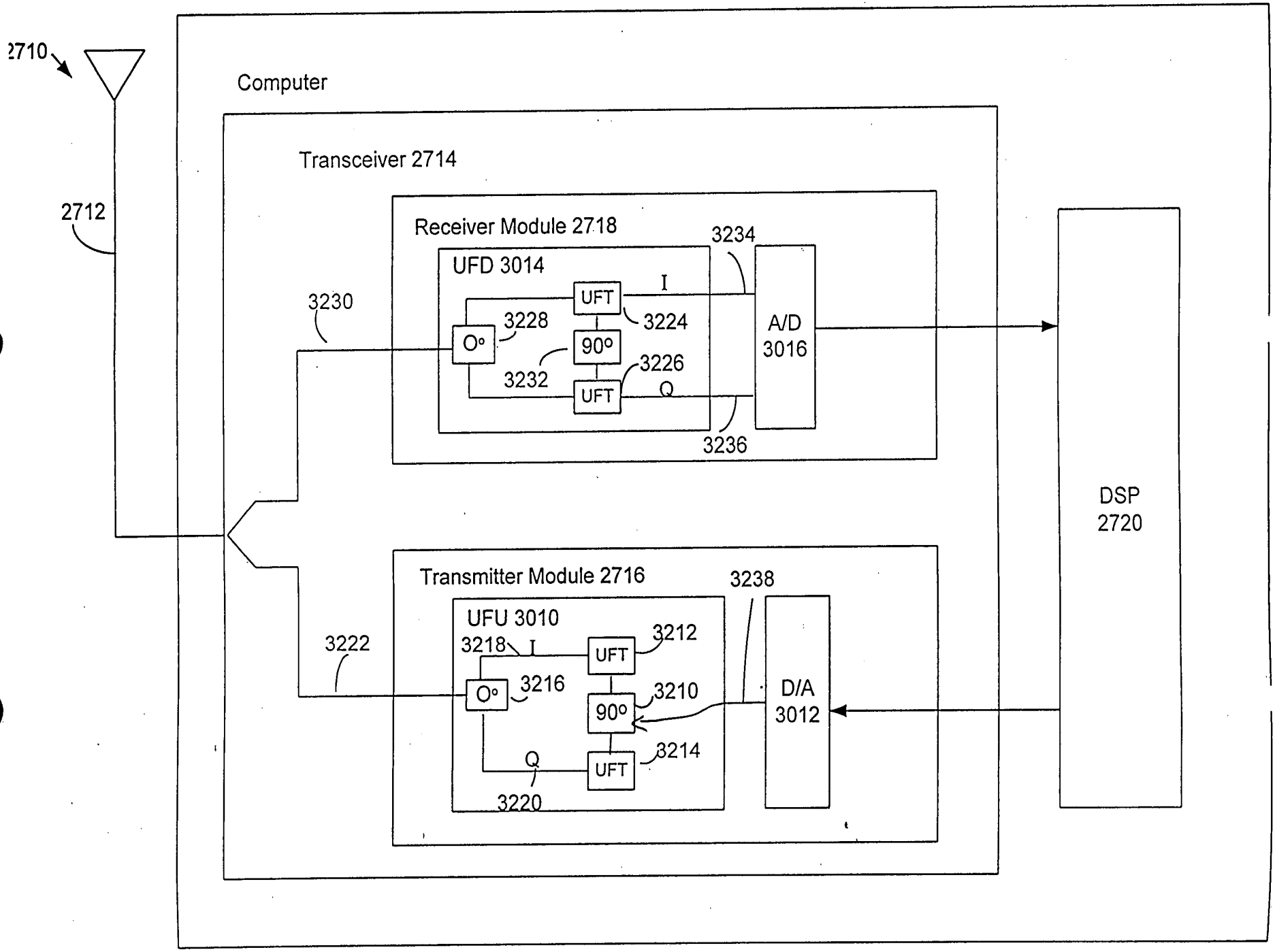


FIG. 32

9905-02.vsd/6

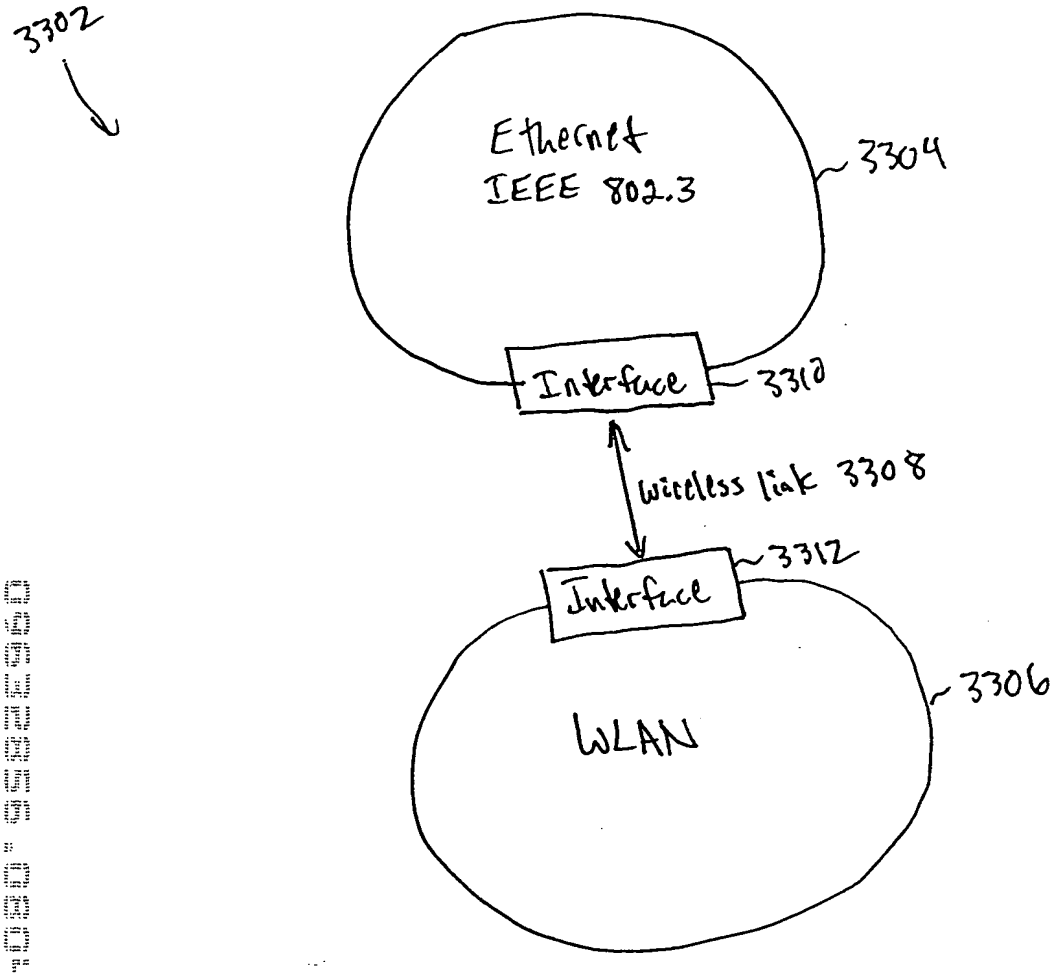

3302
Ethernet
IEEE 802.3
3304
Interface
3310
wireless link 3308
Interface
3312
WLAN
3306

FIG. 33

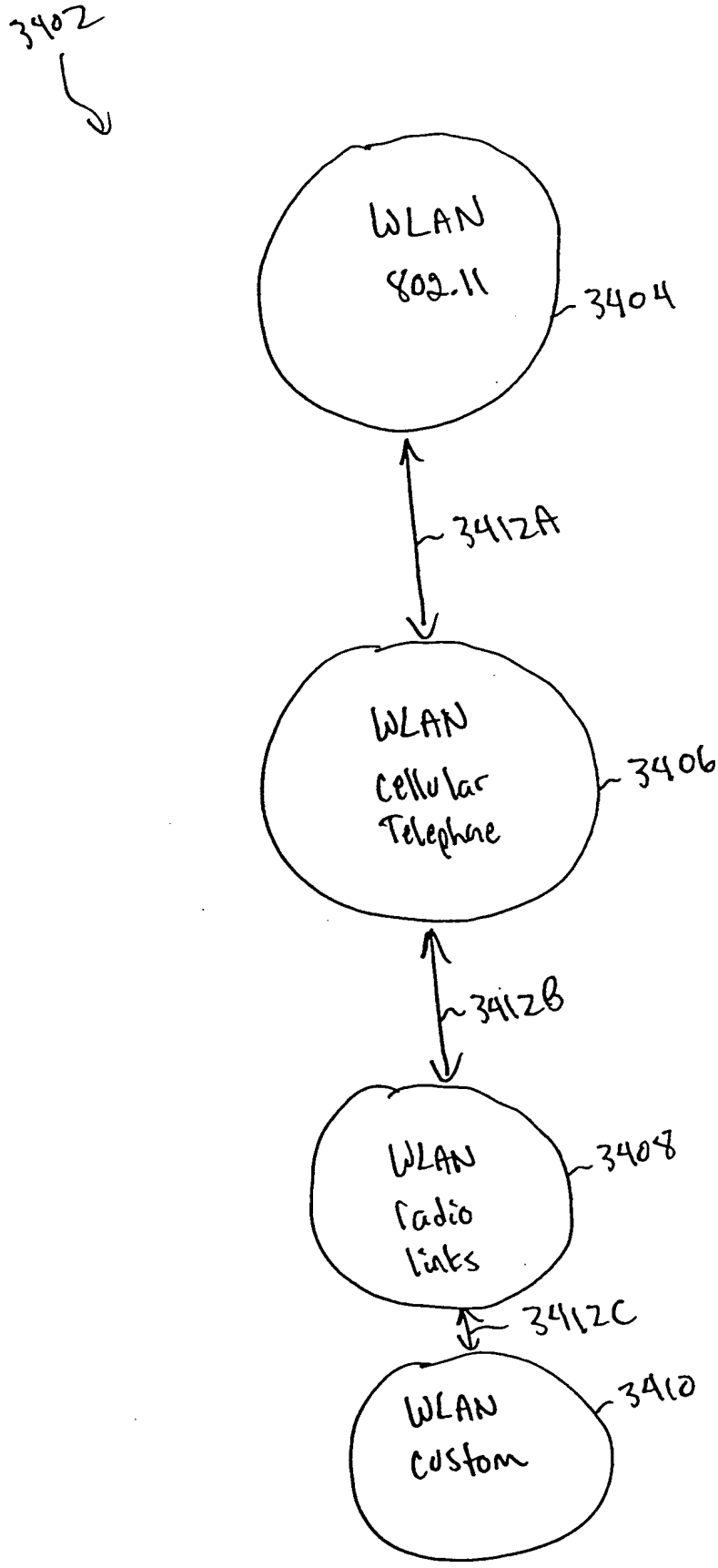

3402
WLAN
802.11
3404
3412A
WLAN
Cellular
Telephone
3406
3412B
WLAN
radio
links
3408
3412C
WLAN
custom
3410

FIG. 34

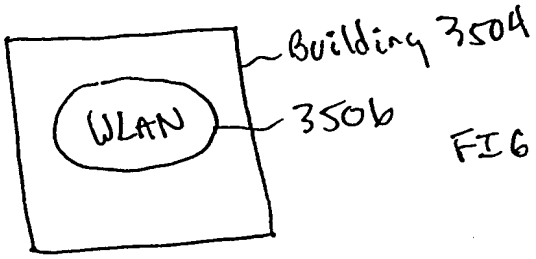

3502
Building 3504
WLAN
3506

FIG. 35

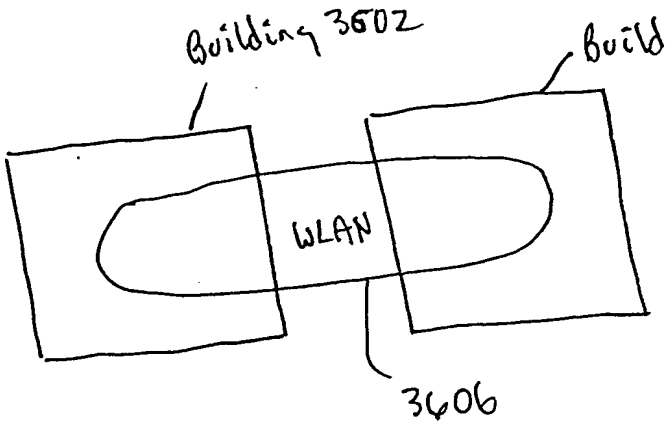

Building 3602
Building 3604
WLAN
3606

FIG. 36

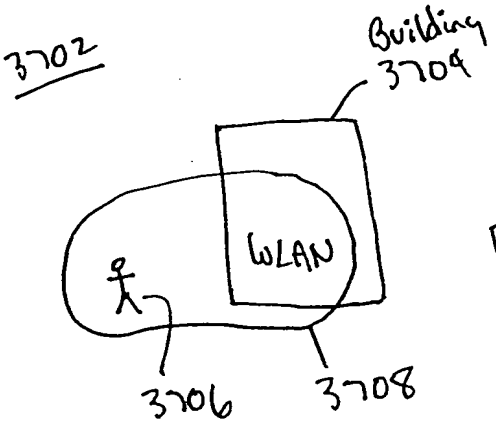

3702
Building
3709
WLAN
3706
3708

FIG. 37

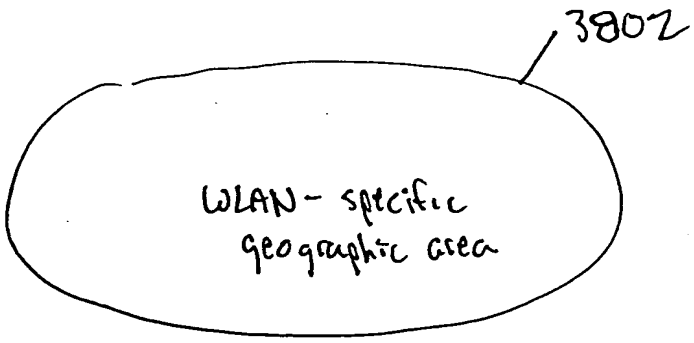

3802
WLAN - specific
geographic area

FIG. 38

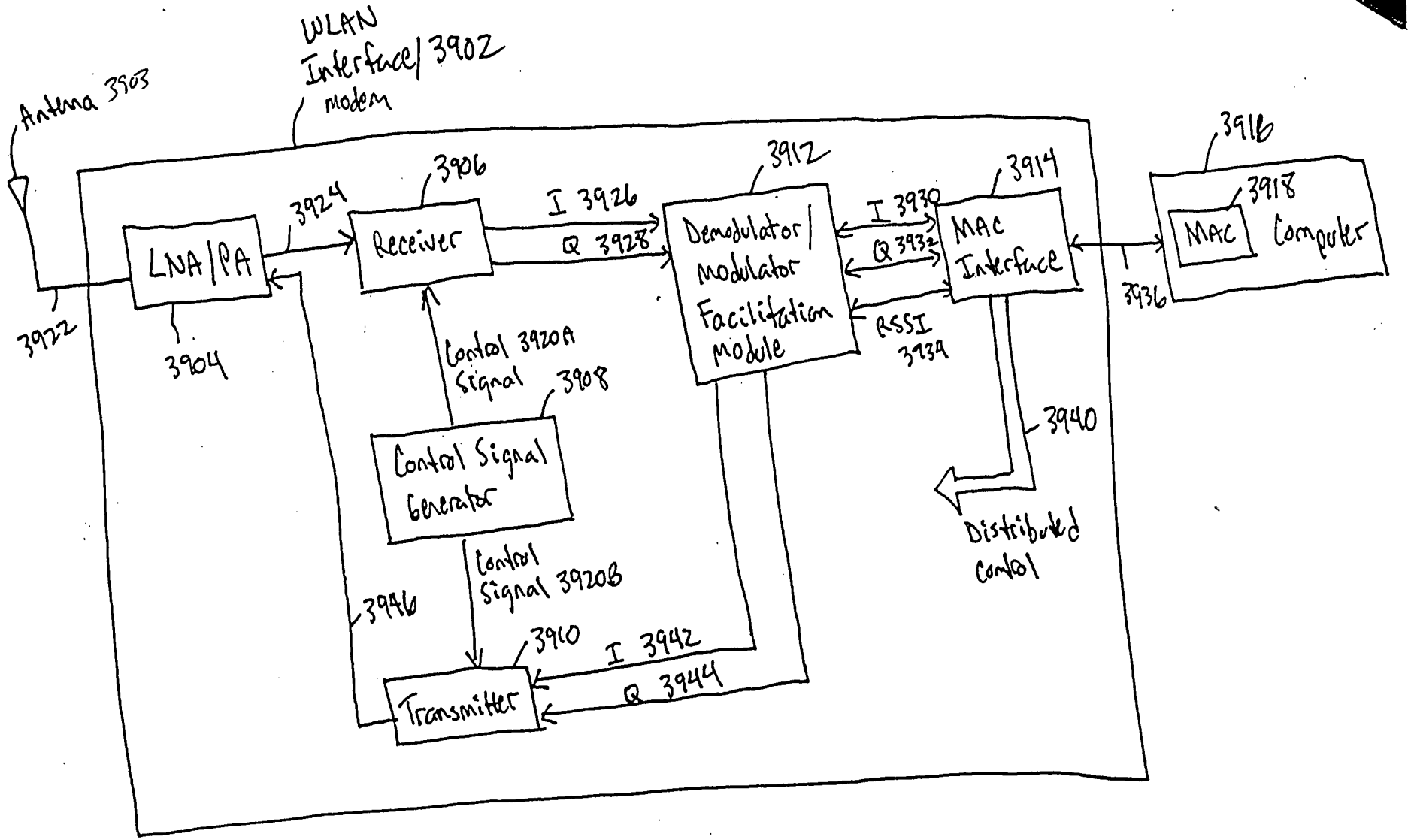


FIG. 39

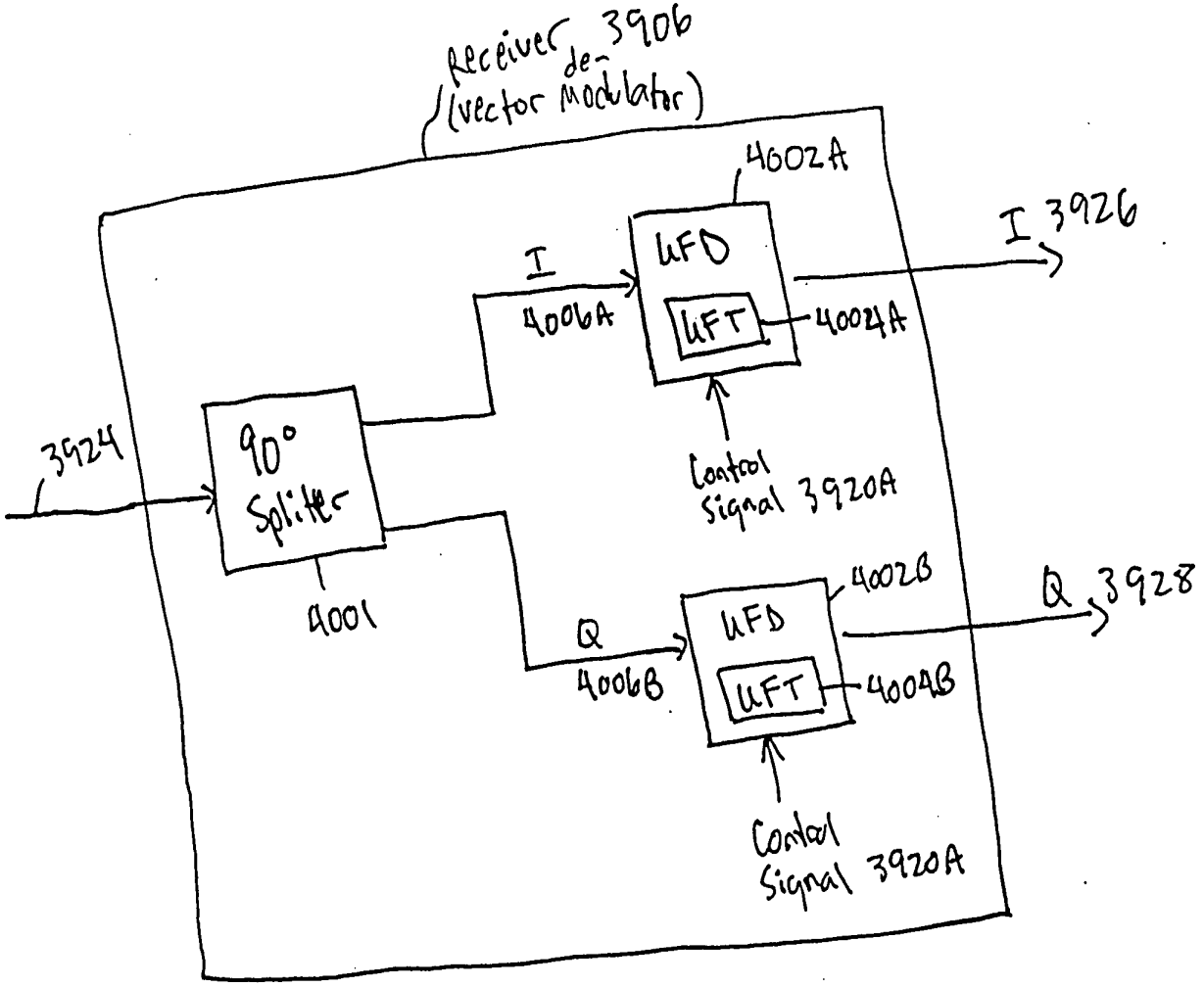


FIG. 40

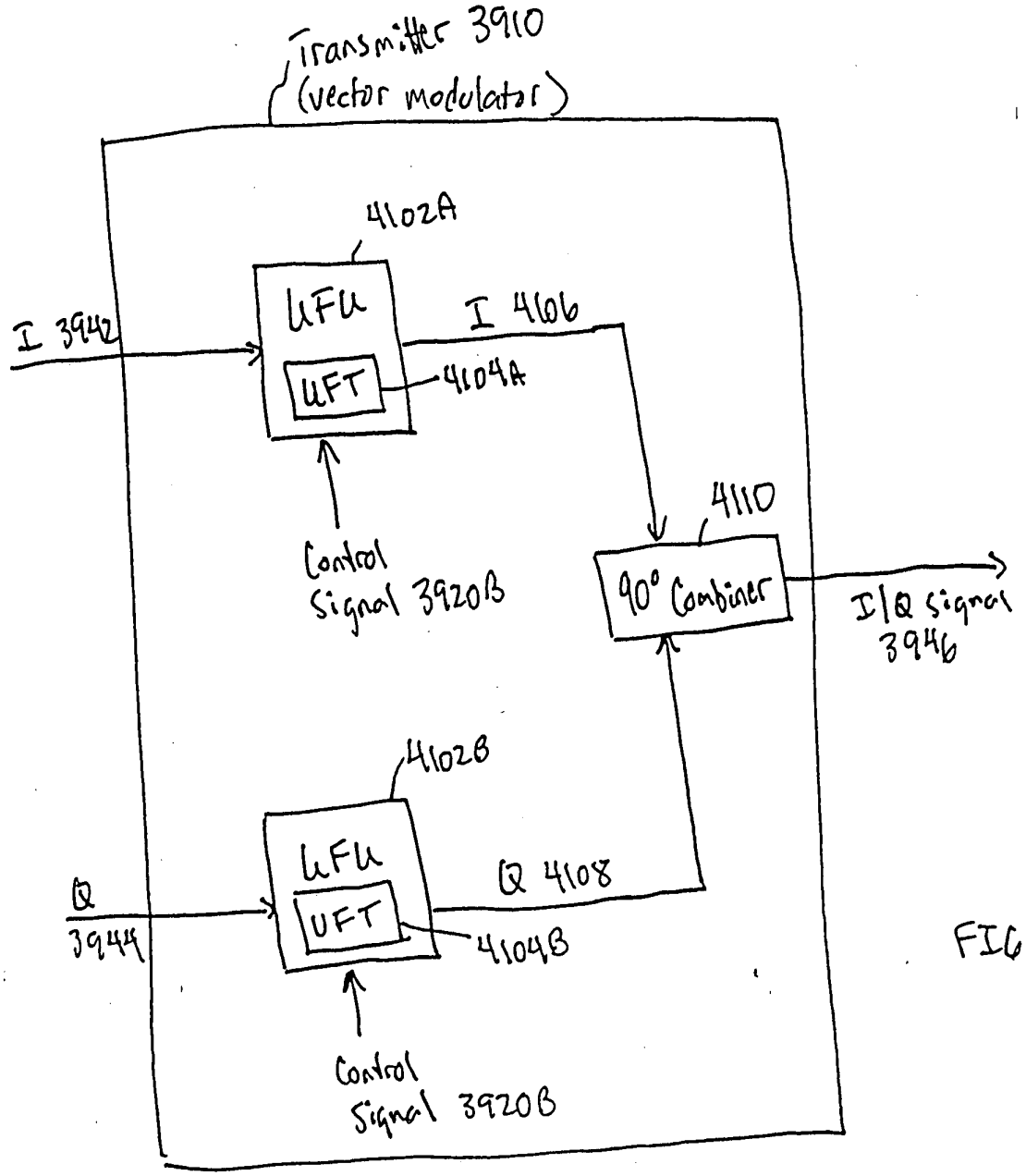
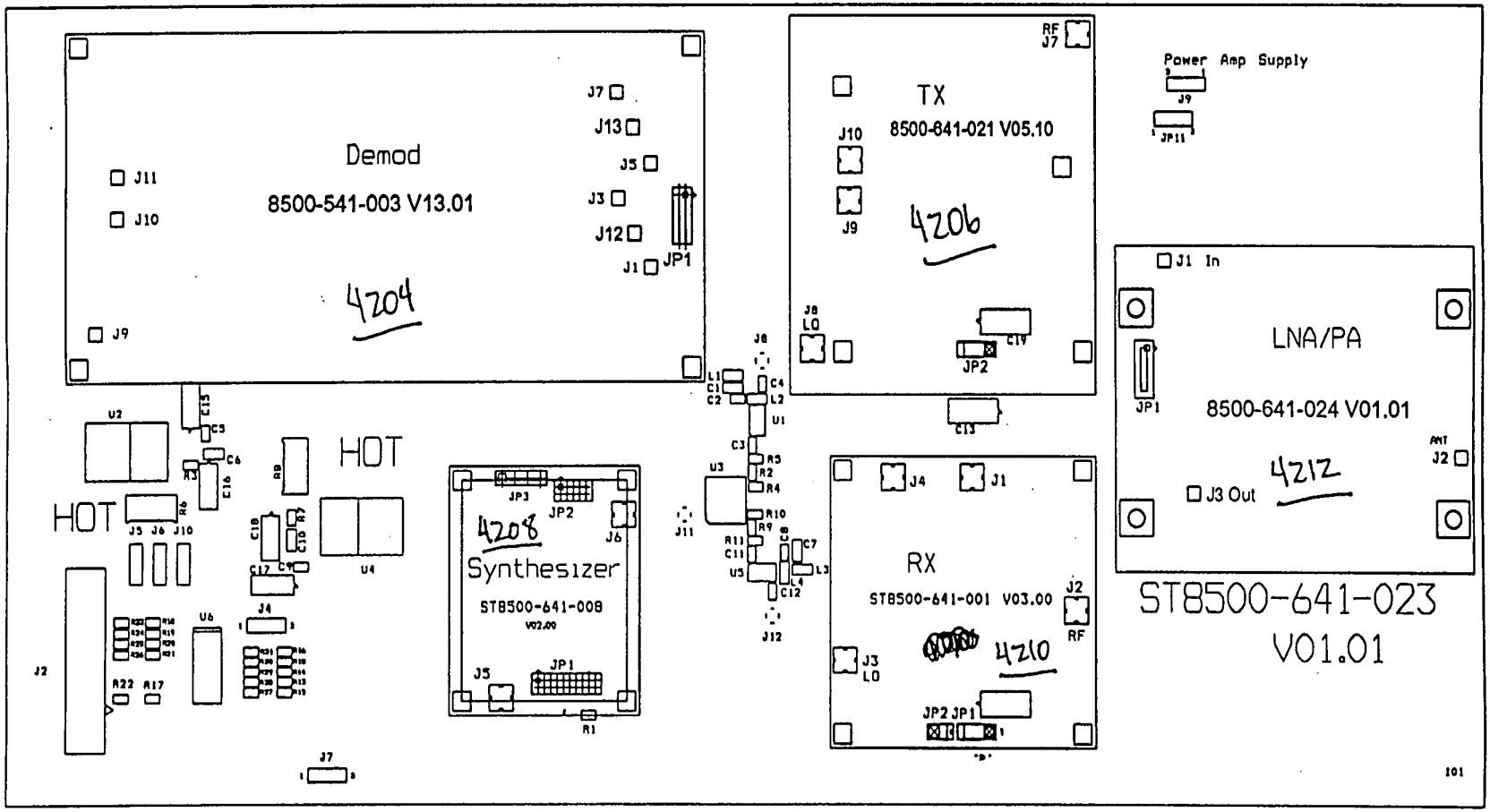

Transmitter 3910
(vector modulator)
4102A
UFU
UFT
4104A
I 3942
I 4106
Control
Signal 3920B
4110
90° Combiner
I/Q signal
3946
4102B
UFU
UFT
4104B
Q
3944
Q 4108
Control
Signal 3920B

FIG. 41

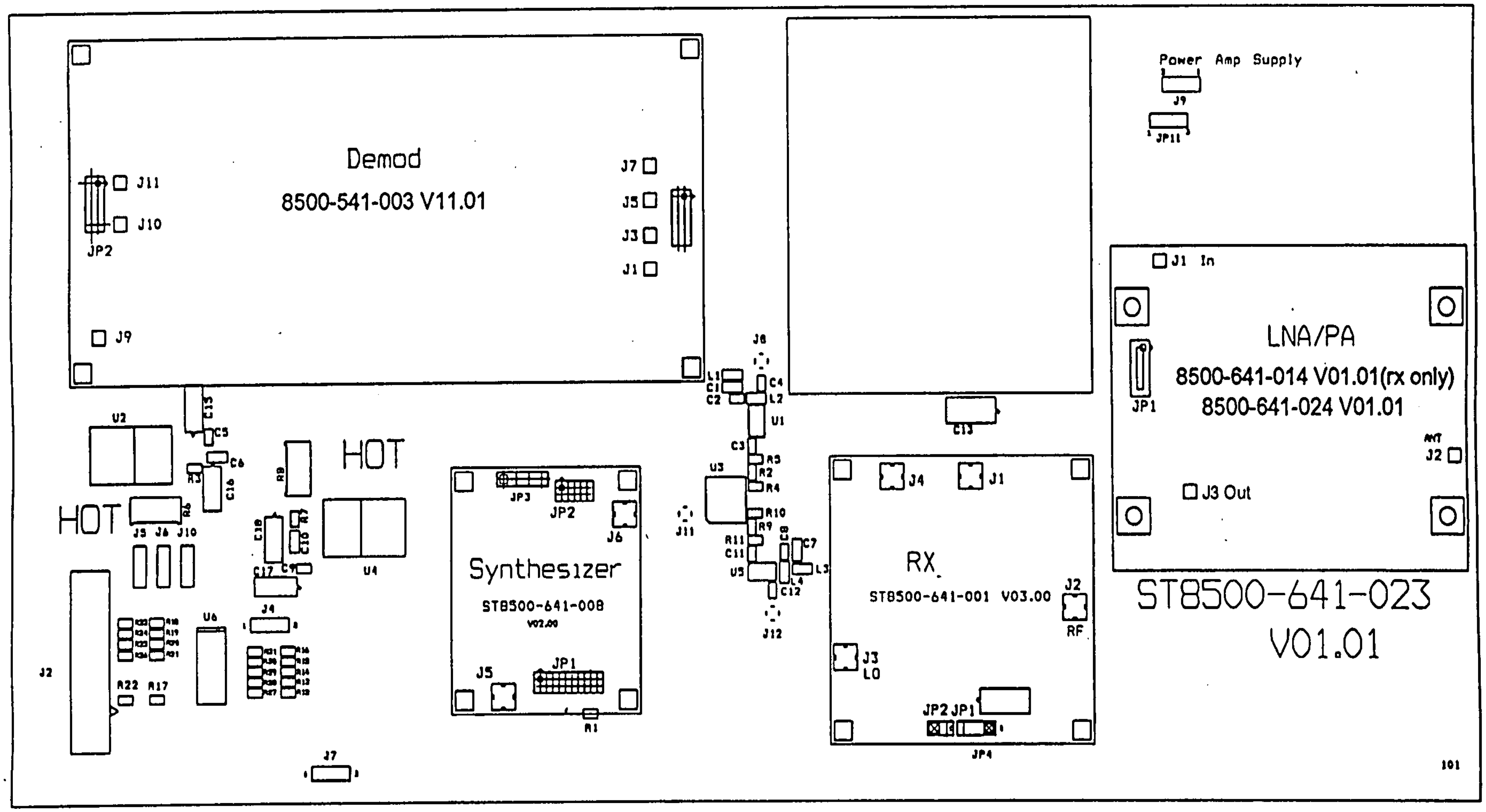
4202



T/R

FIG. 42

4302

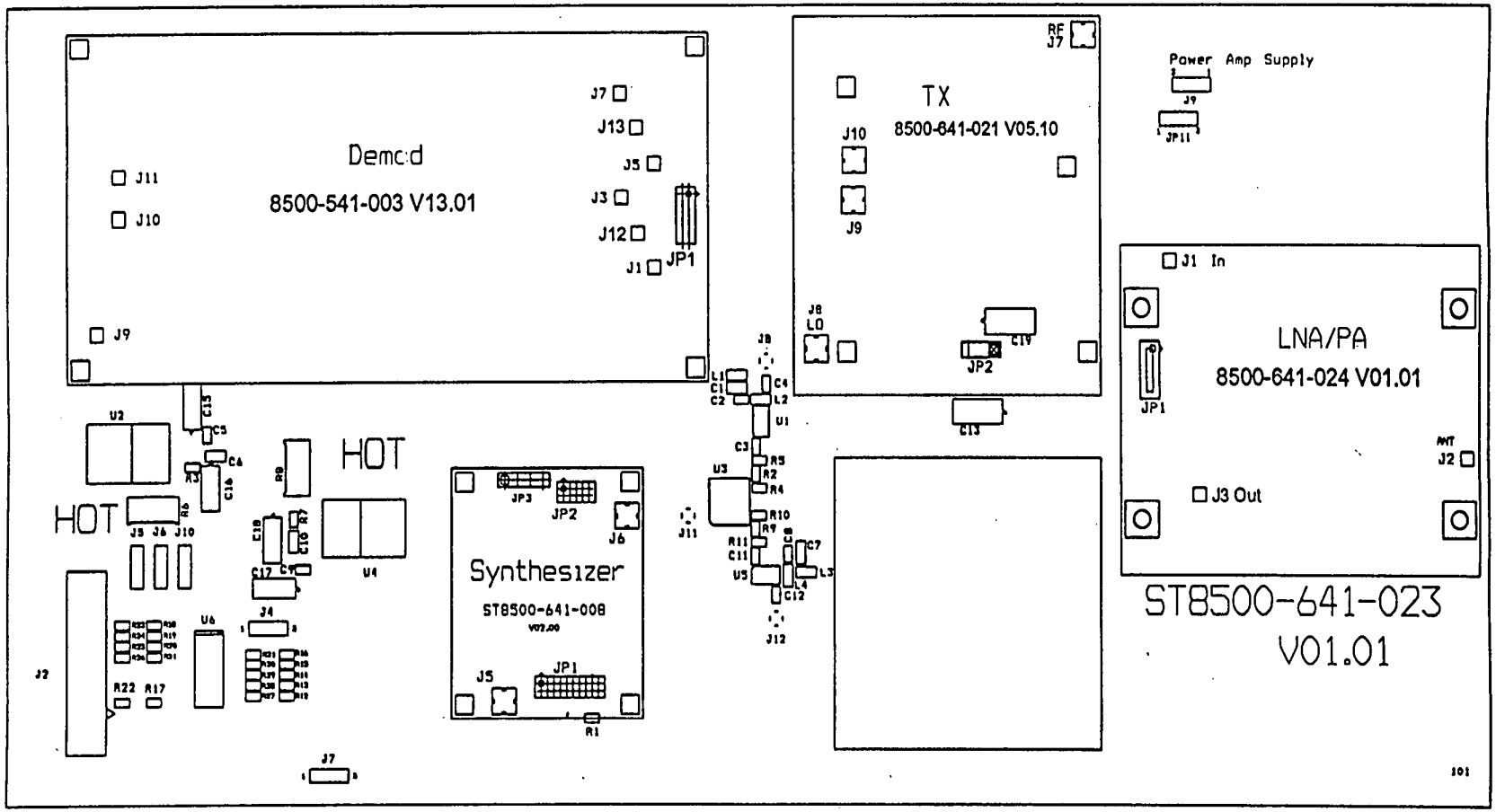


Receive Only

FIG. 43

09632856 .080400

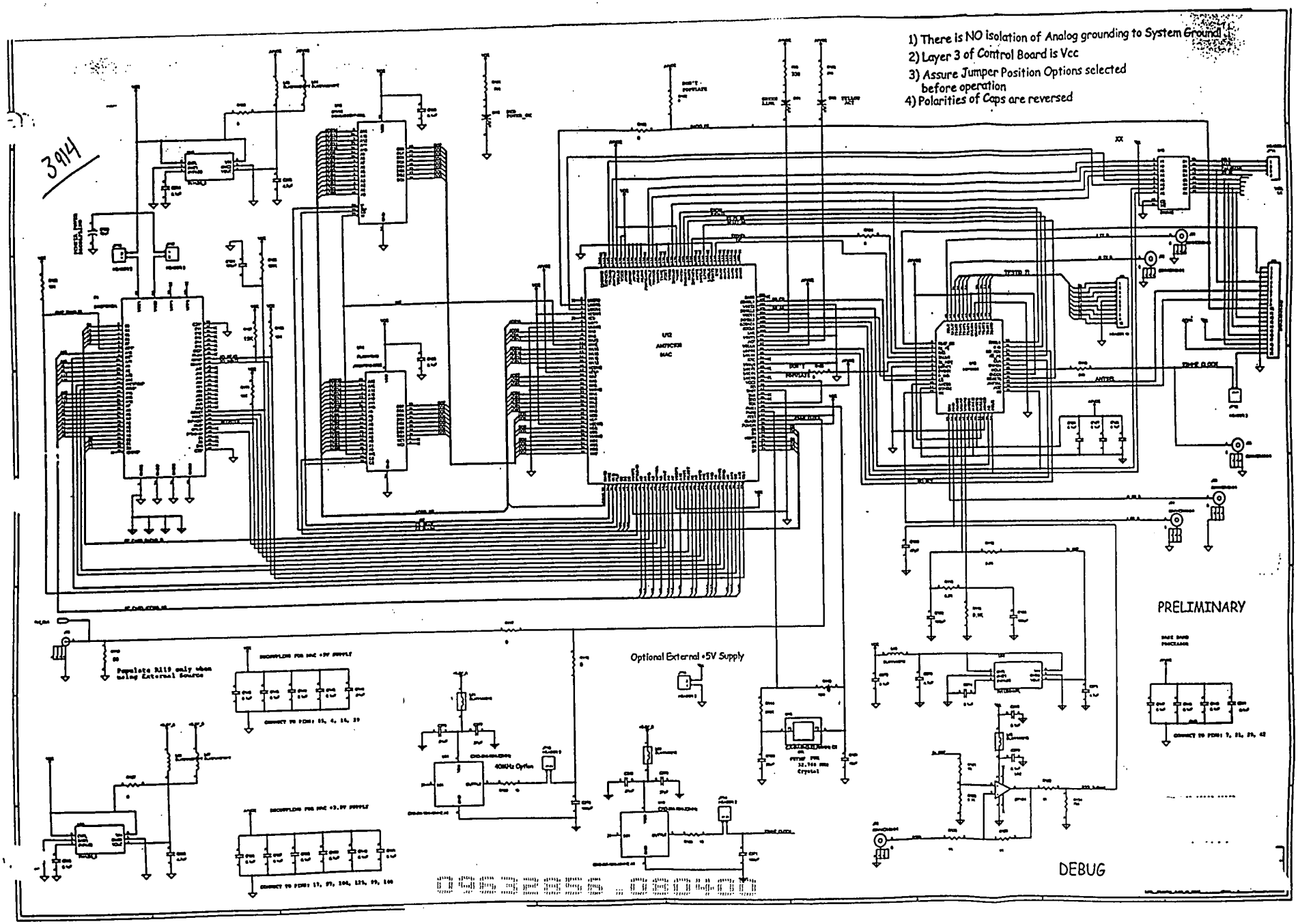
4402



Transmit Only

FIG. 44

FIG. 45


1) There is NO isolation of Analog grounding to System Ground.
2) Layer 3 of Control Board is Vcc
3) Assure Jumper Position Options selected before operation
4) Polarities of Caps are reversed
3914
Optional External +5V Supply
PRELIMINARY
DEBUG

PARK VISION PCMCIA CONTROLLER BOM

Item	Quantity	Reference	Part Description	Part Number	Manufacturer
1	1	C123	10uF CAP 6032, Tantalum,20%	TAJT106K010R	Kemet
2	3	C263, C273, C275, C282	4.7uF CAP 6032,Tantalum,20%	T491A475M006AS	Kemet
3	25	C120, C125, C126, C127, C128, C136, C137, C138, C139, C140, C141, C142, C143, C144, C145, C147, C148, C149, C264, C272, C274, C279, C280, C281, C283	0.1uF CAP 0603,X7R,10%	GRM39X7R104K050AD	Murata
4	3	C146, C269, C276	.01uF CAP 0603,X7R,10%	GRM39X7R103K050AD	Murata
5	5	C124, C132, C133, C271, C278	100pF CAP 0603,X7R,10%	GRM39COG101K050AD	Murata
6	1	C129	47pF CAP 0603,X7R,10%	GRM39COG470J100AD	Murata
7	2	C270, C277	27pF CAP 0603,X7R,10%	GRM39COG270K050AD	Murata
8	1	C130	22pF CAP 0603,X7R,10%	GRM39COG220K050AD	Murata
9	1	C131	10pF CAP 0603,X7R,10%	GRM39COG100D050AD	Murata
10	1	DS1	LED, Green	597-3311-420	Dialight
11	1	DS2	LED Yellow	597-3401-420	Dialight
12	1	DS3	LED Red	597-3111-420	Dialight
13	6	JP12, JP13, JP14, JP15, JP16, JP17	Connector HEADER 2Pin	2MS-19-33-01	Specialty Electronics
14	1	JP11	Connector HEADER 4Pin	100/VH/TM1SQ/W.100/4	BLKCON
15	7	J16, J20, J21, J22, J23, J24, J25	Connector 82MMCX	82MMCX-50-0-1	Huber/Shuner
16	1	J18	Connector Header10	TMS-110-01-G-S	samtec
17	1	J19	Connector with Ejector	EHT-1-10-01-S-D	samtec
18	1	P1	Connector 34X2PCMCIA	DICMJ-68S-SPC-M08	ITT Canon
19	7	L59, L60, L61, L63, L64, L65, L66	Ferrite Bead	BLM11A121S	Murata
20					
21	1	R112	10M, Resistor, 0603, 5%		
22	1	R114	390K, Resistor, 0603, 5%	ERJ-3GSYJ394V	Panasonic
23	1	R105	100K, Resistor, 0603, 5%	ERJ-3GSYJ104V	Panasonic
24	4	R106, R107, R108, R111	15K, Resistor, 0603, 5%	ERJ-3GSYJ153V	Panasonic
25	1	R116	9.1K, Resistor, 0603, 5%	ERJ-3GSYJ912V	Panasonic
26	1	R115	8.2K, Resistor, 0603, 5%	ERJ-3GSYJ822V	Panasonic
27	1	R113	3.9K, Resistor, 0603, 5%	ERJ-3GSYJ392V	Panasonic
28	1	R101	750, Resistor, 0603, 5%	ERJ-3GSYJ751V	Panasonic
29	1	R110	560, Resistor, 0603, 5%	ERJ-3GSYJ561V	Panasonic
30	2	R99, R100	330, Resistor, 0603, 5%	ERJ-3GSYJ331V	Panasonic

FIG. 46A

31	1	R119	50 , Resistor, 0603, F	ERJ-3GSYJ500V	Panasonic
32	2	R128, R129	10 , Resistor, 0603, 5	ERJ-3GSYJ100V	Panasonic
33	8	R102, R103, R104, R109, R117, R118, R120, R127	0, Resistor, 0603, 5%	RM732Z1J000ZT 3GSYJ000V	ERJ- KOA Panasonic
34	6	R121, R122, R123, R124, R125, R126	TBD, Resistor, 0603, 5%	R	Panasonic
35	1	U10	SRAM	KM62256DLTG-5L M5M5256CVP-55LL	Samsung Mitsubushi
36	1	U12	MAC	AM79C930	AMD
37	1	U13	Baseband Processor	HFA3842 A1	Harris
38	1	U14	FLASH RAM	AM29F010-55EC	AMD
39	1	U15	32 KHz Crystal	CX-6V-SM2-32.768KHz C/I	Statek
40	2	U45	Bus Buffer	DS3862	National
41	1	U48	Regulator 3.5 V	TK11235BMC	TOKO
42	1	U49	22MHz Oscillator	FOX F3346-22MHz	FOX
43	1	U50	2 Volt Refference	TK11220BMC	TOKO
44	1	U51	40MHz Oscillator	CXO-M-10N-40MHz A/I	Statek

FIG. 4B

3912

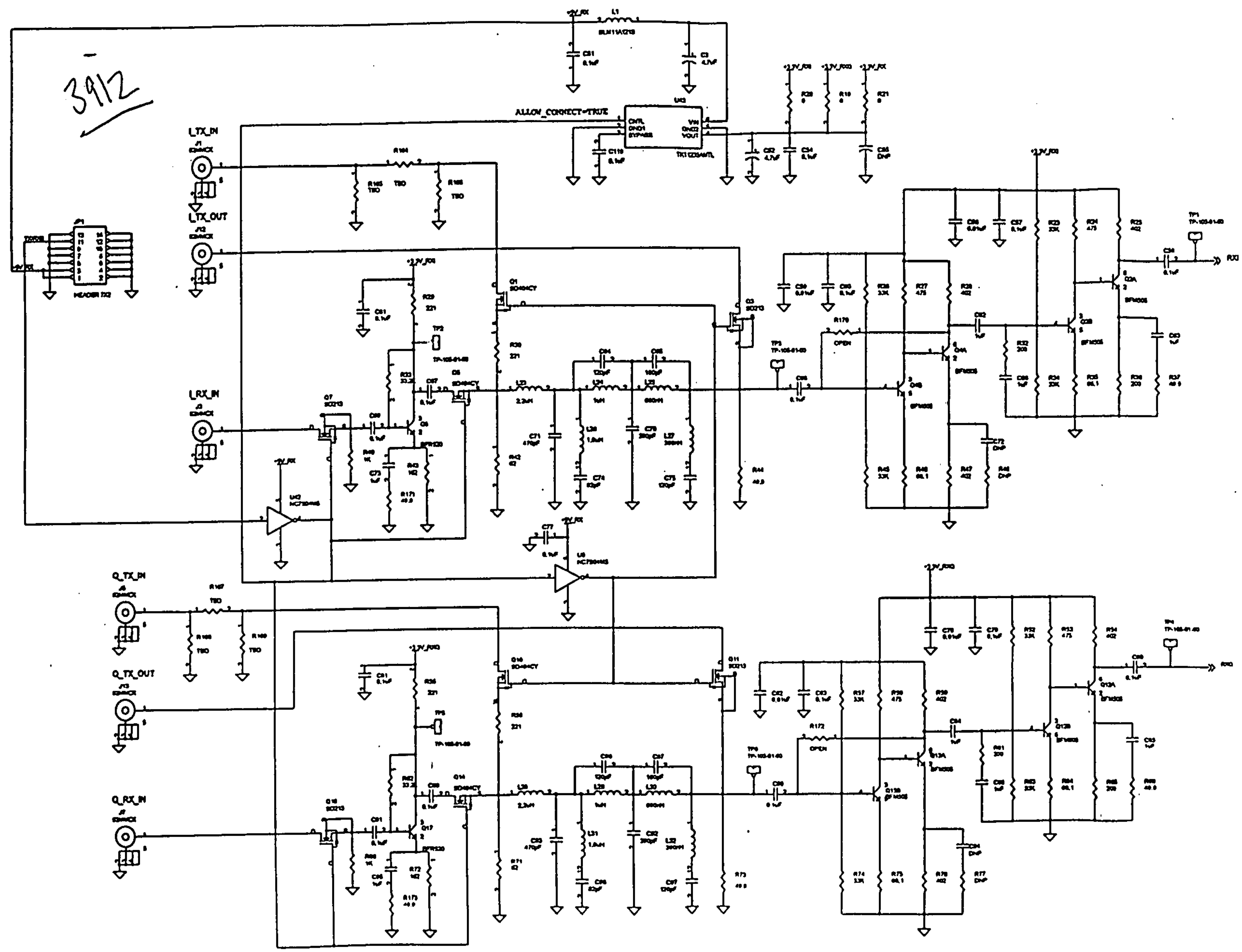


FIG. 47

09632856 .080400

3912

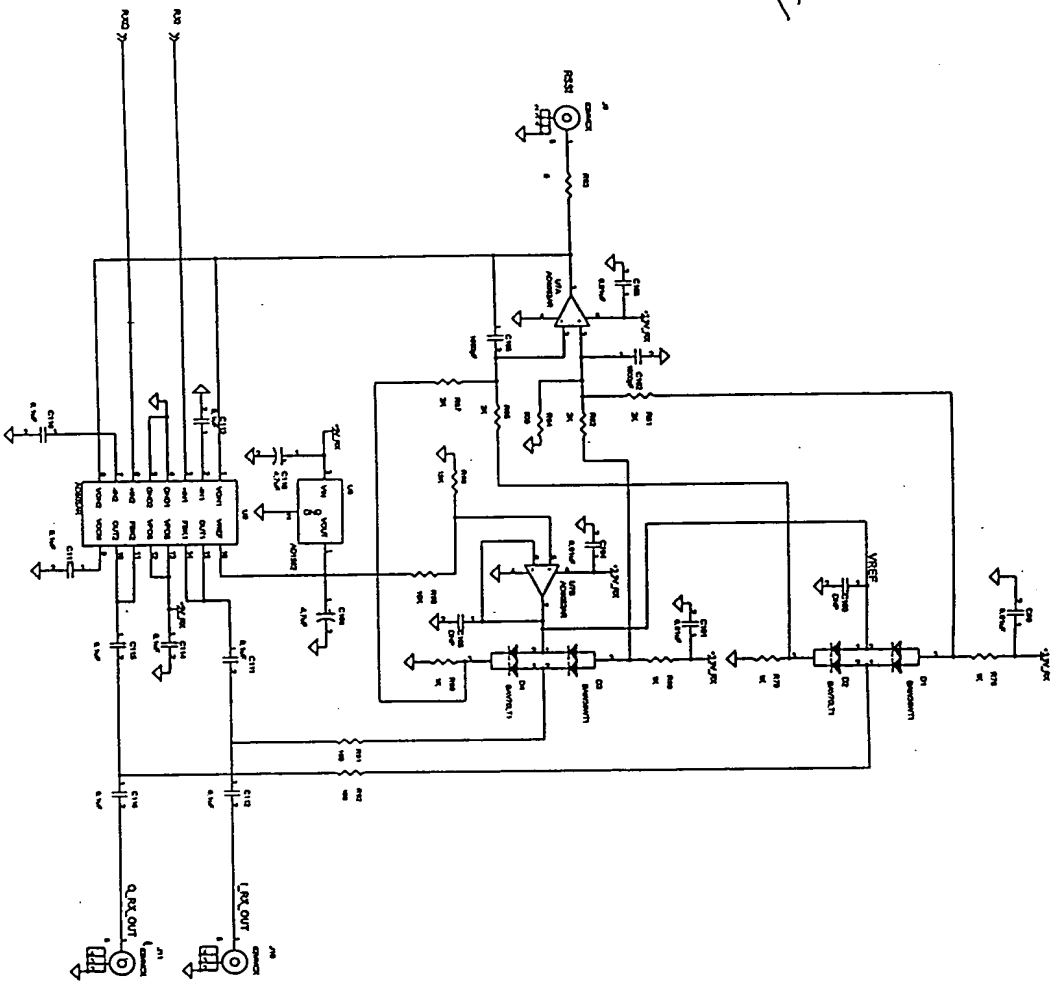


FIG. 4B

Item	Quantity	Reference	Part	Part Number	Manufacturer
1	4	C3,C52,C108,C110	4.7uF	T491A475K006AS	KEMET
2	26	C51,C54,C57,C58,C60,C61,	0.1uF	GRM39Y5V104Z016	Murata
		C67,C68,C69,C77,C79,C80,			
		C81,C83,C89,C90,C91,C111,			
		C112,C113,C114,C115,C116,			
		C117,C118,C119			
3	1	C55	DNP	T491A475K006AS	KEMET
4	8	C56,C59,C78,C82,C99,C101,	0.01uF	GRM39X7R103K050	Murata
		C103,C104			
5	8	C62,C63,C66,C73,C84,C85,	1uF	GRM40Y5V105Z016	Murata
		C88,C95			
6	4	C64,C75,C86,C97	120pF	GRM39COG121J050	Murata
7	2	C65,C87	180pF	GRM39COG181J050	Murata
8	2	C70,C92	390pF	GRM39COG391J050	Murata
9	2	C71,C93	470pF	GRM39COG471J050	Murata
10	2	C72,C94	DNP	GRM40Y5V105Z016	Murata
11	2	C74,C96	82pF	GRM39COG820J050	Murata
[illegible]	2	C100,C106	DNP	DNP	Murata
13	2	C105,C102	1000pF	GRM39COG102K050	Murata
14	2	D3,D1	BAW56WT1	BAW56WT1	Motorola
15	2	D4,D2	BAV70LT1	BAV70LT1	Motorola
16	1	JP1	HEADER 7X2	FTSH-107-02-L-D	Samtec
17	9	J1,J3,J5,J7,J9,J10,J11,	82MMCX	82MMCX-50-0-1	Suhner
		J12,J13			
18	1	L1	BLM11A121S	BLM11A121S	Murata
19	2	L23,L28	2.2uH	LQG21N2R2K10	Murata
20	2	L29,L24	1uH	LQG21N1R0K10	Murata
21	2	L30,L25	680nH	LQG21NR68K10	Murata
22	2	L26,L31	1.8uH	LQG21N1R8K10	Murata
23	2	L32,L27	390nH	LQG21NR39K10	Murata
24	4	Q1,Q5,Q10,Q14	SD404CY	SD404CY	Calogic
25	4	Q2,Q4,Q12,Q13	BFM505	BFM505	Philips
26	4	Q3,Q7,Q11,Q16	SD213	SD213	Calogic
27	2	Q17,Q8	BFR520	BFR520	Philips
28	4	R19,R20,R21,R83	0	ERJ3GSY0R00	Panasonic
29	8	R23,R26,R34,R45,R52,R57,	33K	ERJ3GSYJ333	Panasonic
		R63,R74			
30	4	R24,R27,R53,R58	475	ERJ3EKF4750	Panasonic
31	6	R25,R28,R47,R54,R59,R76	402	ERJ3EKF4020	Panasonic
32	4	R29,R30,R55,R56	221	ERJ3EKF2210	Panasonic
33	2	R32,R61	200	ERJ3GSYJ201	Panasonic
[illegible]4	2	R33,R62	33.2K	ERJ3GSYJ333	Panasonic
	4	R35,R46,R64,R75	68.1	ERJ3EKF68R1	Panasonic

FIG. 49A

36	2	R36,R65	200	ERJ3EKF2000	Panasonic
7	6	R37,R44,R66,R73,R171,	49.9	ERJ3EKF49R9	Panasonic
		R173			
38	6	R40,R68,R78,R79,R80,R89	1K	ERJ3EKF1001	Panasonic
39	2	R42,R71	62	ERJ3GSYJ620	Panasonic
40	2	R43,R72	162	ERJ3EKF1620	Panasonic
41	2	R77,R48	DNP	ERJ3GSYJ330	Panasonic
42	4	R81,R82,R85,R87	2K	ERJ3EKF2001	Panasonic
43	1	R84	909	ERJ3EKF9090	Panasonic
44	1	R88	15K	ERJ3EKF1502	Panasonic
45	1	R90	10K	ERJ3EKF1002	Panasonic
46	2	R91,R92	100	ERJ3EKF1000	Panasonic
47	6	R164,R165,R166,R167,R168,	TBD		Panasonic
		R169			
48	2	R170,R172	OPEN		Panasonic
49	6	TP1,TP2,TP3,TP4,TP5,TP6	TP-105-01-00		
50	2	U42,U6	NC7S04M5	NC7S04M5	National Semiconductor
51	1	U7	AD8052AR	AD8052AR	Analog Devices
52	1	U8	AD1582	AD1582	Analog Devices
53	1	U9	AD605AR	AD605AR	Analog Devices
54	1	U43	TK11235AMTL	TK11235BM	Toko
55	1		Board	8500.541.003 V13.01	

FIG. 49B

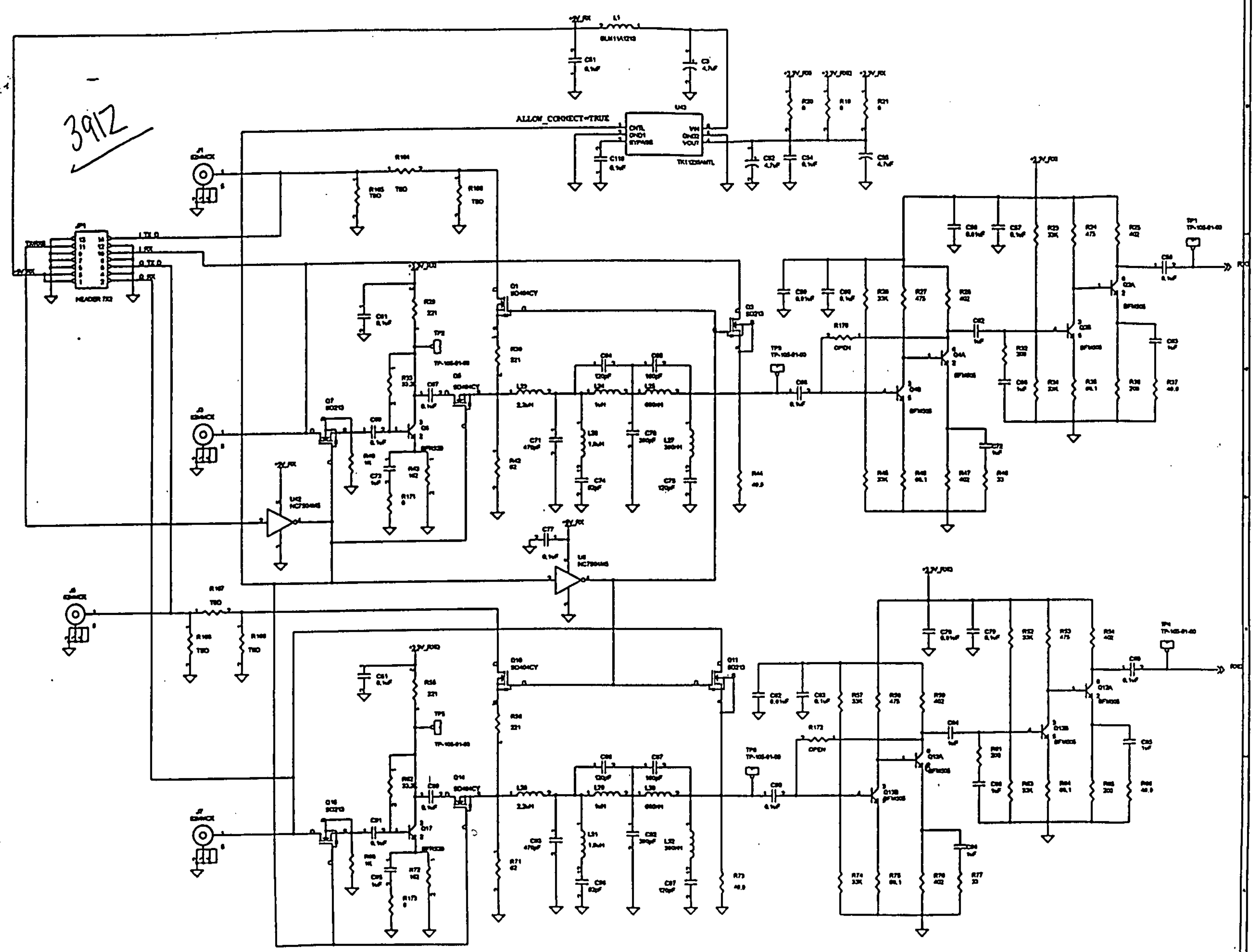


FIG. 5D

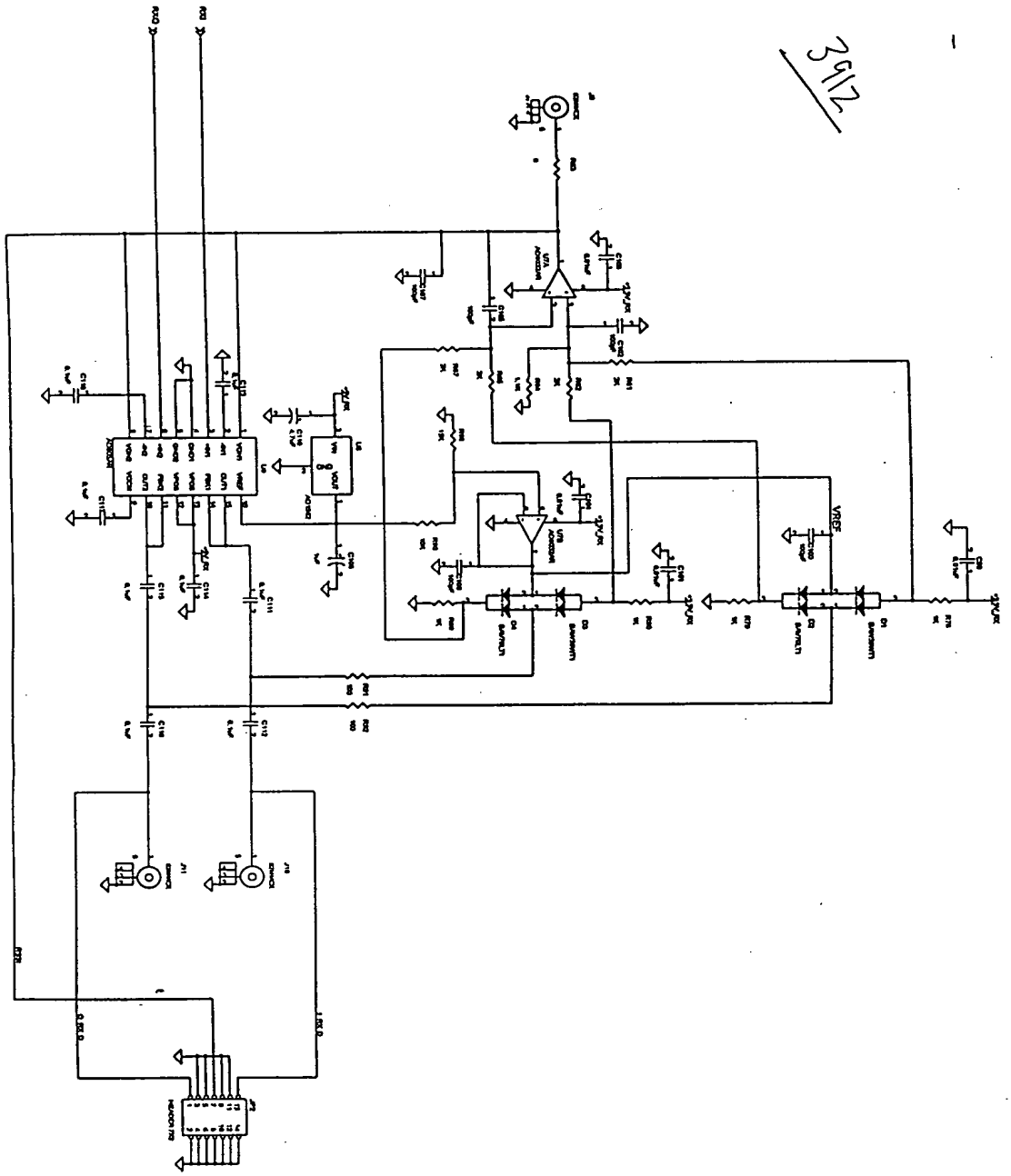


Fig. 5A

Bill Of Materials

Item	Quantity	Reference	Part	Part Number	Manufacturer
1	3	C3,C52,C55	4.7uF	T491A475K006AS	KEMET
2	26	C51,C54,C57,C58,C60,C61,	0.1uF	GRM39Y5V104Z016	Murata
		C67,C68,C69,C77,C79,C80,			
		C81,C83,C89,C90,C91,C111,			
		C112,C113,C114,C115,C116,			
		C117,C118,C119			
3	8	C56,C59,C78,C82,C99,C101,	0.01uF	GRM39X7R103K050	Murata
		C103,C104			
4	10	C62,C63,C66,C72,C73,C84,	1uF	GRM40Y5V105Z016	Murata
		C85,C88,C94,C95			
5	4	C64,C75,C86,C97	120pF	GRM39COG121J050	Murata
6	2	C87,C65	180pF	GRM39COG181J050	Murata
7	2	C70,C92	390pF	GRM39COG391J050	Murata
8	2	C71,C93	470pF	GRM39COG471J050	Murata
9	2	C96,C74	82pF	GRM39COG820J050	Murata
10	5	C100,C102,C105,C106,C107	100pF	GRM39COG101K050	Murata
11	1	C108	1uF		
	1	C110	4.7uF		
13	2	D3,D1	BAW56WT1	BAW56WT1	Motorola
14	2	D4,D2	BAV70LT1	BAV70LT1	Motorola
15	2	JP2,JP1	HEADER 7X2		
16	6	J1,J3,J5,J7,J10,J11	82MMCX	142-0701-231	Johnson
17	1	J9	82MMCX	82MMCX-50-0-1	Suhner
18	1	L1	BLM11A121S	BLM11A121S	Murata
19	2	L28,L23	2.2uH	LQG21N2R2K10	Murata
20	2	L24,L29	1uH	LQG21N1R0K10	Murata
21	2	L30,L25	680nH	LQG21NR68K10	Murata
22	2	L26,L31	1.8uH	LQG21N1R8K10	Murata
23	2	L27,L32	390nH	LQG21NR39K10	Murata
24	4	Q1,Q5,Q10,Q14	SD404CY	SD404CY	Calogic
25	4	Q2,Q4,Q12,Q13	BFM505	BFM505	Philips
26	4	Q3,Q7,Q11,Q16	SD213	SD213	Calogic
27	2	Q17,Q8	BFR520	BFR505	Philips
28	5	R19,R20,R21,R171,R173	0		
29	8	R23,R26,R34,R45,R52,R57,	33K	ERJ3GSYJ333	Panasonic
		R63,R74			
30	4	R24,R27,R53,R58	475	ERJ3EKF4750	Panasonic
31	6	R25,R28,R47,R54,R59,R76	402	ERJ3EKF4020	Panasonic
32	4	R29,R30,R55,R56	221	ERJ3EKF2210	Panasonic
33	2	R32,R61	200	ERJ3GSYJ201	Panasonic
34	2	R33,R62	33.2K	ERJ3GSYJ333	Panasonic
	4	R35,R46,R64,R75	68.1	ERJ3EKF68R1	Panasonic
	2	R36,R65	200	ERJ3EKF2000	Panasonic

FIG. 52A

37	2	R66,R37	49.9	ERJ3EKF49R9	Panasonic
8	6	R40,R68,R78,R79,R80,R89	1K	ERJ3EKF1001	Panasonic
39	2	R42,R71	62	ERJ3GSYJ620	Panasonic
40	2	R43,R72	162	ERJ3EKF6810	Panasonic
41	2	R44,R73	49.9	ERJ3EKF1001	Panasonic
42	2	R77,R48	33	ERJ3GSYJ330	Panasonic
43	4	R81,R82,R85,R87	2K	ERJ3EKF2001	Panasonic
44	1	R83	0	ERJGSY0R00	Panasonic
45	1	R84	1.1K	ERJ3EKF2001	Panasonic
46	1	R88	15K	ERJ3EKF1502	Panasonic
47	1	R90	10K	ERJ3EKF1002	Panasonic
48	2	R91,R92	100	ERJ3EKF1000	Panasonic
49	6	R164,R165,R166,R167,R168,	TBD		
		R169			
50	2	R170,R172	OPEN		
51	6	TP1,TP2,TP3,TP4,TP5,TP6	TP-105-01-00		
52	2	U42,U6	NC7S04M5		National Semiconductor
53	1	U7	AD8032AR	AD8032AR	Analog Devices
54	1	U8	AD1582	AD1582	Analog Devices
55	1	U9	AD605AR	AD605AR	Analog Devices
56	1	U43	TK11235AMTL	TK11235AMTL	Toko

FIG. 52B

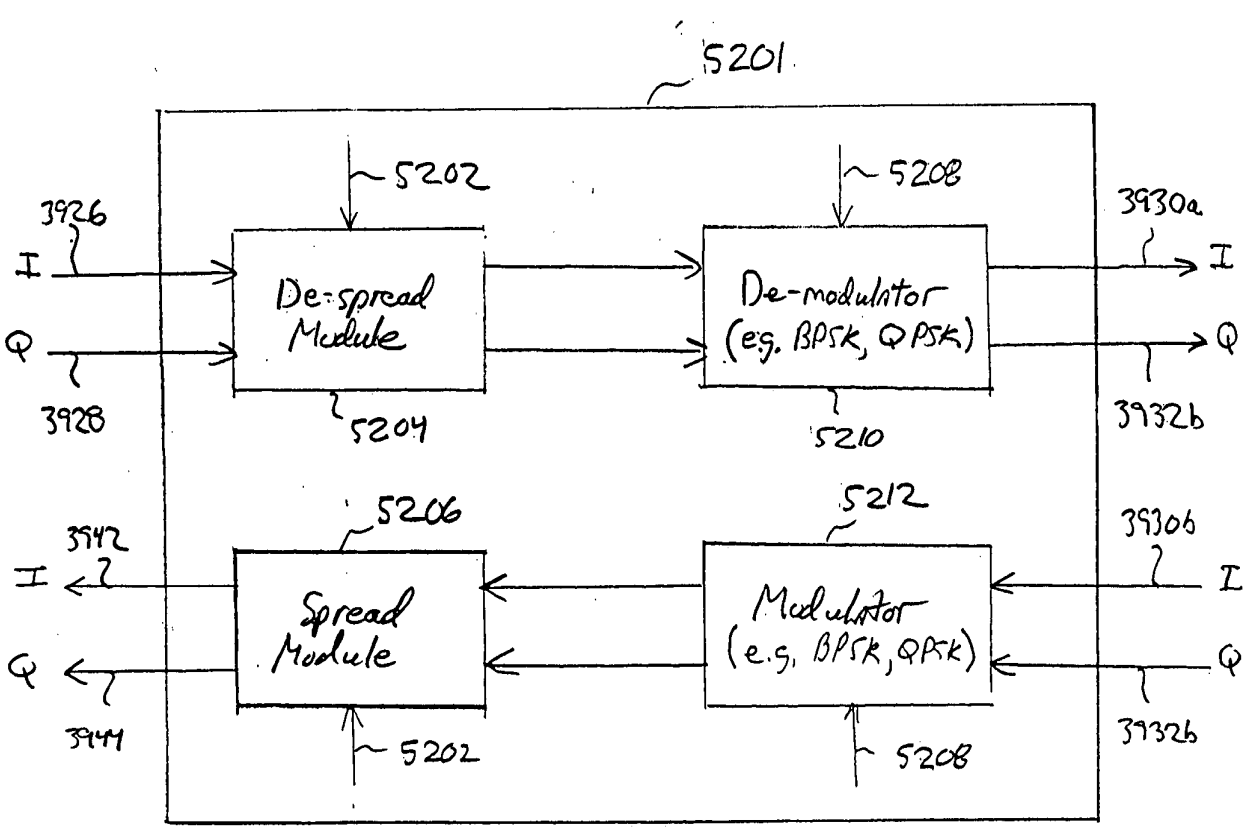
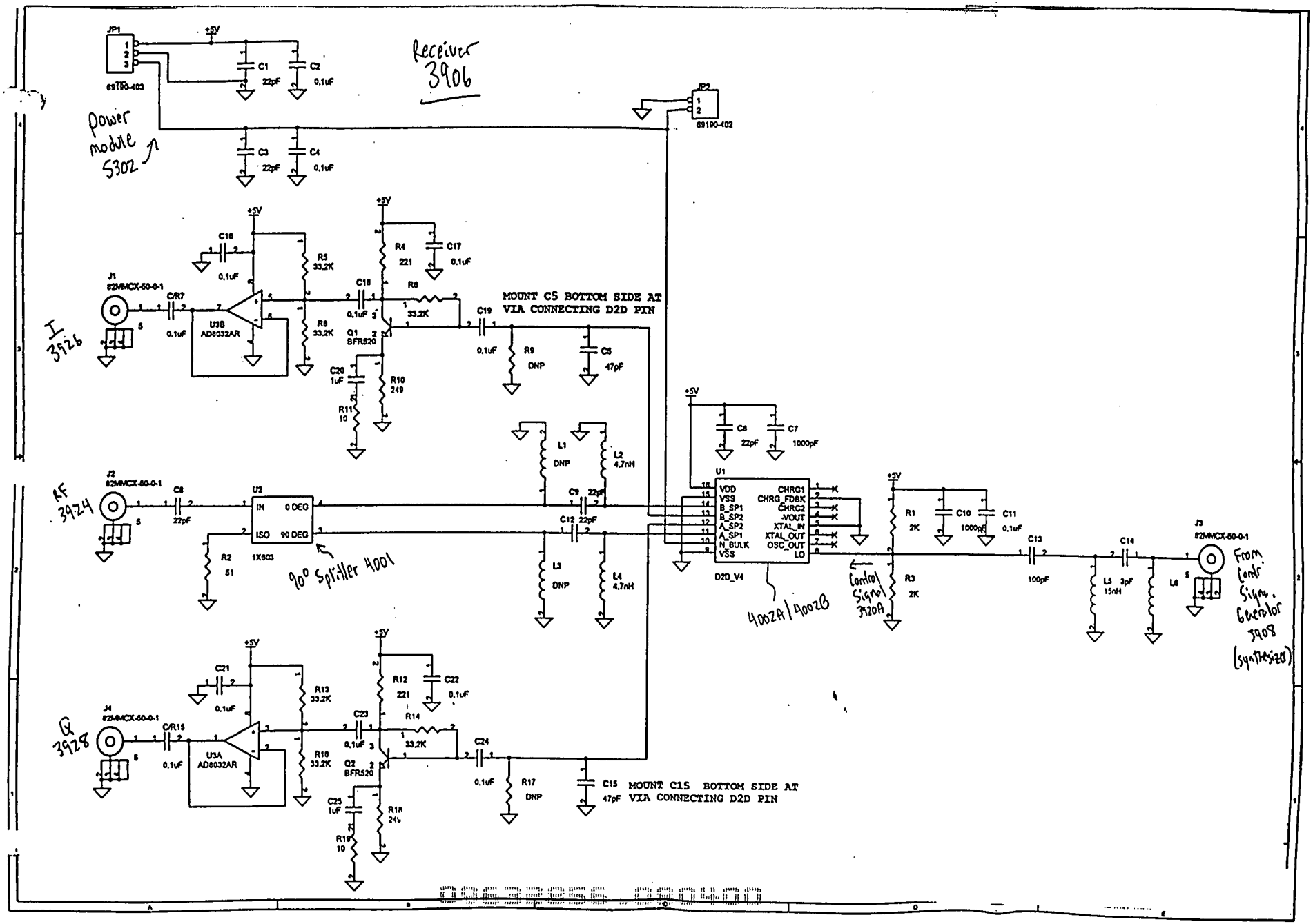

3912
5201
5202
5208
3926
I
Q
3928
De-spread Module
5204
De-modulator (e.g. BPSK, QPSK)
5210
3930a
I
Q
3932b
5206
5212
3942
I
Q
3944
Spread Module
5202
Modulator (e.g. BPSK, QPSK)
5208
3930b
I
Q
3932b

FIG. 52C

FIG. 53


Receiver 3906
Power module 5302
MOUNT C5 BOTTOM SIDE AT VIA CONNECTING D2D PIN
MOUNT C15 BOTTOM SIDE AT VIA CONNECTING D2D PIN
90° Splitter 4001
4002A/4002B
Control Signal 3720A
From Cont. Sign. Generator 3908 (synthesizer)
D2D_V4

Item	Quantity	Reference	Part	Part Number	Manufacturer
1	10	C/R7,C/R15,C16,C17,C18,	0.1uF	GRM39Y5V104Z016	Murata
		C19,C21,C22,C23,C24			
2	6	C1,C3,C6,C8,C9,C12	22pF	GRM39COG220J050	Murata
3	3	C2,C4,C11	0.1uF	GRM39X7R104K016	Murata
4	2	C5,C15	47pF	GRM39COG470J050	Murata
5	2	C10,C7	1000pF	GRM39X7R102K050	Murata
6	1	C13	100pF	GRM39X7R101J050	Murata
7	1	C14	3pF	GRM40COG030B50V	Murata
8	2	C20,C25	1uF	GRM40Y5V105Z016	Murata
9	1	JP1	69190-403	69190-403	BERG
10	1	JP2	69190-402	69190-402	BERG
11	4	J1,J2,J3,J4	82MMCX-50-0-1	82MMCX-50-0-1	Suhner
12	2	L3,L1	DNP	L	TOKO
13	2	L4,L2	4.7nH	LL1608-F4N7K	TOKO
14	1	L5	15nH	LL2012FH15NJ	TOKO
15	1	L6	DNP	DNP	TOKO
16	2	Q1,Q2	BFR520	BFR520	Philips
17	2	R1,R3	2K	ERJ3GSYJ202	Panasonic
18	1	R2	51	ERJ3GSYJ510	Panasonic
19	2	R4,R12	221	ERJ3EKF2210	Panasonic
20	6	R5,R6,R8,R13,R14,R16	33.2K	ERJ3EKF3322	Panasonic
21	2	R9,R17	DNP	ERJ3EKF1001	Panasonic
22	2	R10,R18	249	ERJ3EKF2490	Panasonic
23	2	R11,R19	10	ERJ3GSYJ100	Panasonic
24	1	U1	D2D_V4	D2D_V4	Parker Vision
25	1	U2	1X603	1X603	Anaren
26	1	U3	AD8032AR	AD8032AR	Analog Devices
27	1		BARE D	ST8500.LA1.001	V03.00

FIG. 5A

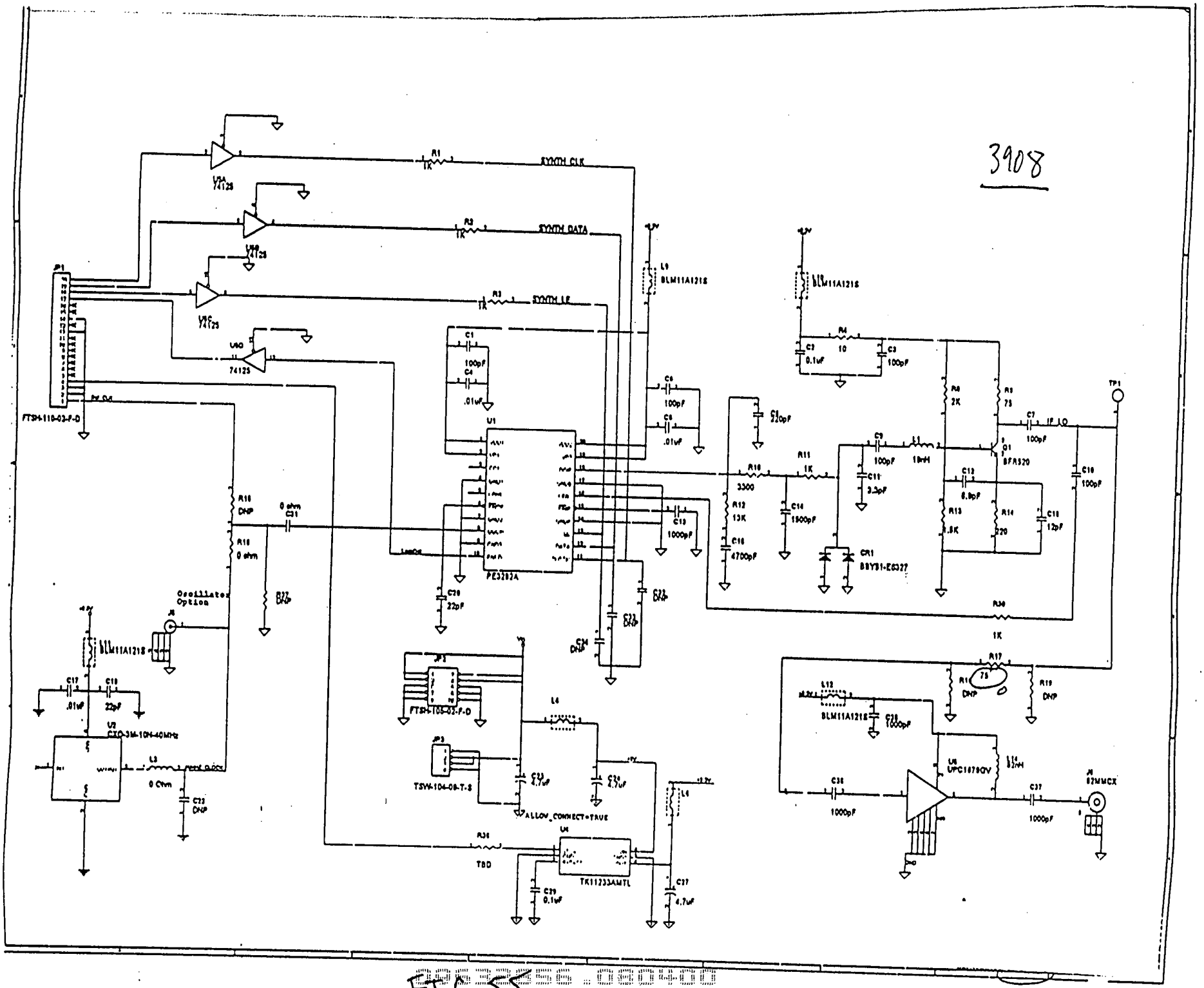

3908
SYNTH CLK
SYNTH DATA
SYNTH LE
Oscillator Option
ALLOW_CONNECT=TRUE
TBD
PE3282A
TK11233AMTL
BBY31-E6327
BFR520
UPC1678GV
FTSH-110-03-F-D
FTSH-105-02-F-D
TSW-104-08-T-S
CYO-3M-10M-40MHz
74125
BLM11A121S
SMMCX

FIG. 55

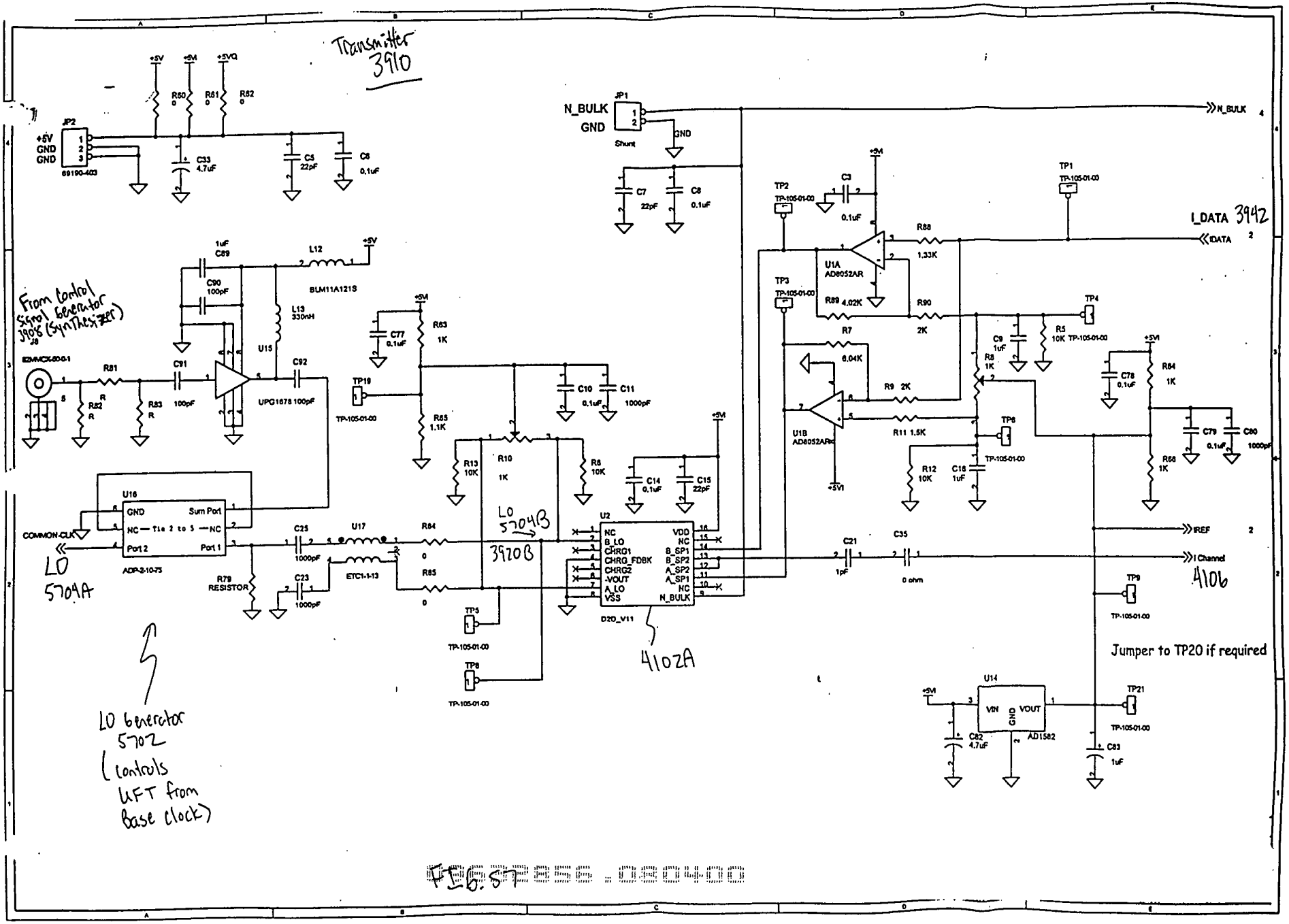
Item	Qty	Reference	Part	Description	Part Number	Manufacturer
1	1	CR1	BBY51-E6327	Diode, Varactor	BBY51-E6327	Siemens
2	6	C1,C3,C5,C7,C9,C10	100pF	Capacitor, ceramic, 100pF, 10%, COG, 0603	GRM39COG101K050	Murata
3	2	C29,C2	0.1uF	Capacitor, ceramic, .1uF, 10%, X7R, 0603	GRM39X7R104K016AD	Murata
4	3	C4,C8,C17	.01uF	Capacitor, ceramic, .01uF, 10%, X7R, 0603	GRM39X7R103K050	Murata
5	1	C6	220pF	Capacitor, ceramic, 220pF, 5%, COG, 0603	GRM39COG221J025	Murata
6	1	C11	3.3pF	Capacitor, ceramic, 3.3pF, 5% , COG, 0603	GRM39COG3R3B100V	Murata
7	1	C12	6.8pF	Capacitor, ceramic, 6.8pF, +/-.25pF, COG, 0603	GRM39COG6R8C100V	Murata
8	4	C13,C35,C36,C37	1000pF	Capacitor, ceramic, 1000pF, 10%, X7R, 0603	GRM39X7R102K016	Murata
9	1	C14	1500pF	Capacitor, ceramic, 1500pF, 10%, X7R, 0603	GRM39X7R152K016	Murata
10	1	C15	12pF	Capacitor, ceramic, 12pF, 5%, COG, 0603	GRM39COG150J050	Murata
11	1	C16	4700pF	Capacitor, ceramic, 4700pF, 10%, 0603	GRM39X7R472K016	Murata
12	2	C20,C18	22pF	Capacitor, ceramic, 22pF, 10%, COG, 0603	GRM36COG220K050	Murata
13	4	C22,C32,C33,C34	DNP	Capacitor, ceramic, , , , 0603		Murata
14	3	C23,C24,C27	4.7uF	Capacitor, tantalum, 4.7uF, 10%, 3216	T491A475K006AS	Kemet
15	23	R16,C31, R17	0 ohm	Resistor, zero ohm, 0603	ERJ3GSY0R00	Panasonic
16	1	JP1	FTSH-110-02-F-D	Header, dual row 10x2, .050x.050	FTSH-110-02-F-D	Samtec
17	1	JP2	FTSH-105-02-F-D	Header, dual row 5x2, .050x.050	FTSH-105-02-F-D	Samtec
18	1	JP3	TSW-104-08-T-S	Header, single row 4 pin, .100"	TSW-104-08-T-S	Berg
19	2	J5,J6	82MMCX	RF Connector	82MMCX-50-0-1	Suhner
20	1	L1	18nH	Inductor, 18nH, 10%, 0805	0805CS-180XJBC	Coilcraft
21	1	L3	0 Ohm	Zero Ohm Jumper	RM73ZIJT	KOA
22	6	L4,L6,L9,L10,L11,L12	BLM11A121S	Ferrite Bead, 0603	BLM11A121S	Murata
23	1	L14	82nH	Inductor, 82nH, 10%, 0805	LL2012-F82NK	Toko
24	1	Q1	BFR520	Transistor, NPN	BFR520	Philips
25	5	R1,R2,R3,R11,R30	1K	Resistor, 1K, 5%, 0603	ERJ3GSYJ102	Panasonic
26	1	R4	10	Resistor, 10 ohm, 5%, 0603	ERJ3GSYJ1R0	Panasonic
27	1	R8	2K	Resistor, 2K, 5%, 0603	ERJ3GSYJ202	Panasonic
28	21	R9,~~R17~~	75	Resistor, 75 ohm, 5%, 0603	ERJ3GSYJ750	Panasonic
29	1	R10	3300	Resistor, 3.3K, 5%, 0603	ERJ3GSYJ332	Panasonic
30	1	R12	13K	Resistor, 13K, 5%, 0603	ERJ3GSYJ133	Panasonic
31	1	R13	1.5K	Resistor, 1.5K, 5%, 0603	ERJ3GSYJ152	Panasonic

12pF

FIG. 5A

32	1	R14	220	Resistor, 220 ohm, 5%, 0603	ERJ3GSYJ221	Panasonic
33	1	R15	DNP	Resistor, zero ohm, 0603	ERJ3GSY0R00	Panasonic
34	2	R18,R19	DNP	Resistor, 91 ohm, 5%, 0603	ERJ3GSYJ910	Panasonic
35	1	R36	TBD	Resistor, zero ohm, 0603	ERJ3GSY0R00	Panasonic
36	1	R37	DNP	Resistor, , , 0603		Panasonic
37	1	TP1	Test Point			
38	1	U1	PE3282A	IC, Synthesizer	PE3282A	Peregrine
39	1	U2	CXO-3M-10N-40MHz	Xtal Osc, 40MHz	CXO-3M-10N-40MHZ A/I	Statek
40	1	U4	TK11233AMTL	Voltage Regulator, 3.5V	TK11235BM	Toko
41	1	U5	74125	IC, BUFFER	MC74LCX125DT	Motorola
42	1	U6	UPC1678GV	IC, RF Amplifier	UPC1678GV	NEC
43	1		STB500.641.00B V02.00	BOARD		

FIG. 56B


Transmitter 3910
N_BULK
GND
Shunt
I_DATA 3942
IDATA
From control signal generator 3908 (synthesizer)
LO 5709A
LO 5704B 3920B
4102A
LO generator 5702 (controls LFT from Base clock)
I Channel
4106
IREF
Jumper to TP20 if required
COMMON-CUT
U1A AD8052AR
U1B AD8052AR
U2
U14
U15
U16
U17
D20_V11
ADP-3-10-75
UPG1678
AD1582
BLM11A121S
ETC1-1-13
R79 RESISTOR

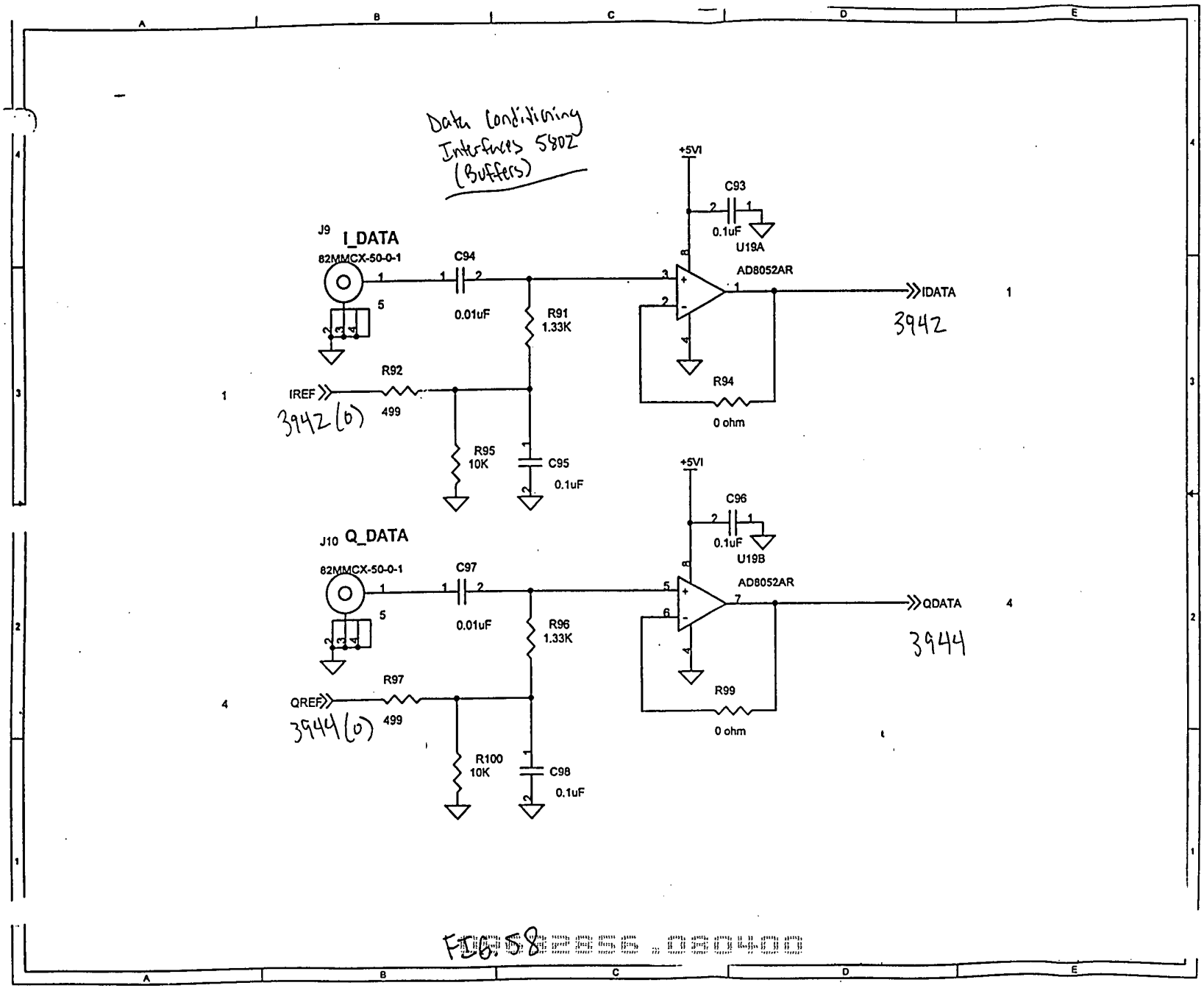
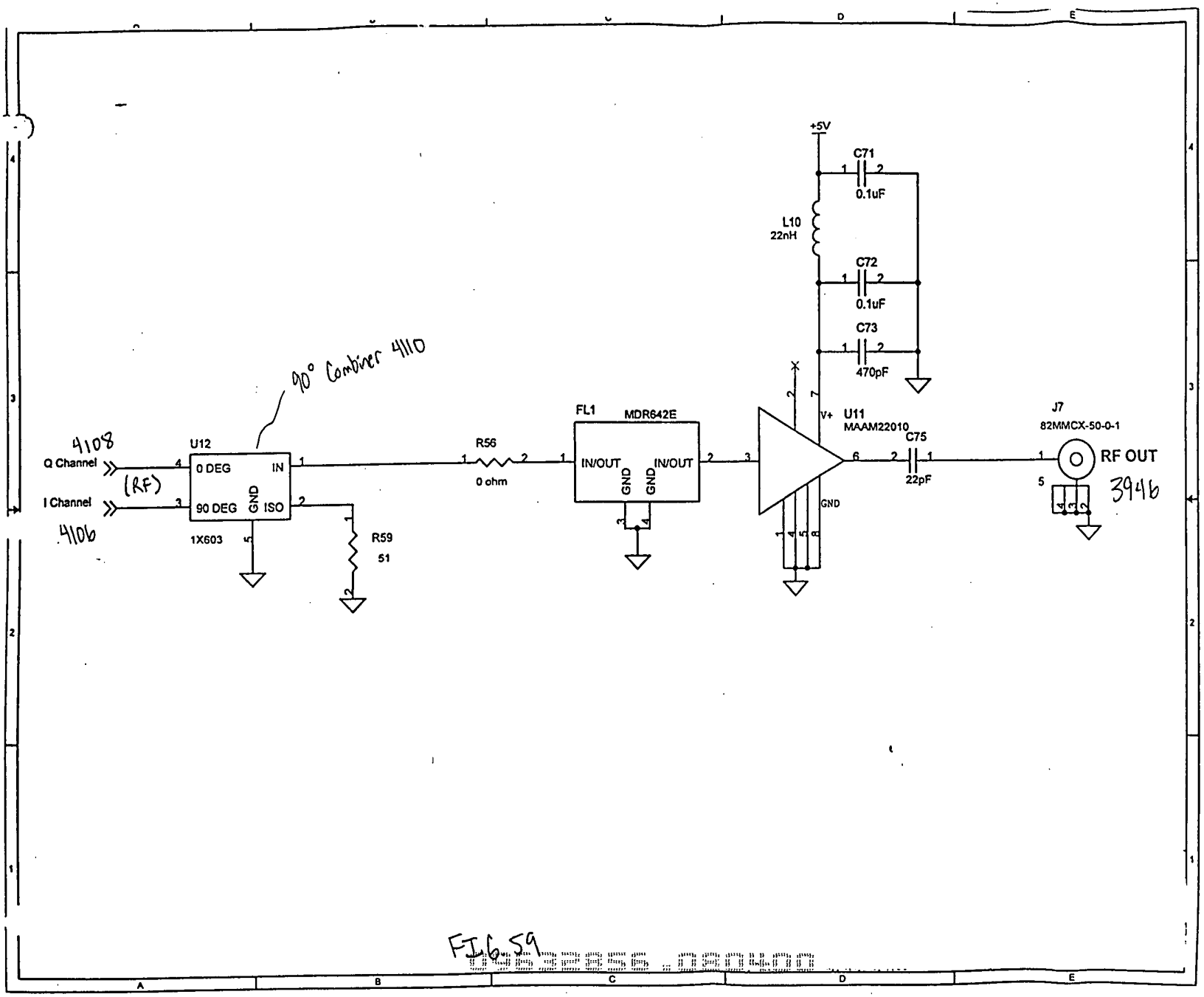

Data Conditioning
Interfaces 5802
(Buffers)
J9
I_DATA
82MMCX-50-0-1
C94
0.01uF
R91
1.33K
R92
IREF
3942(0)
499
R95
10K
C95
0.1uF
+5VI
C93
0.1uF
U19A
AD8052AR
IDATA
3942
R94
0 ohm
J10
Q_DATA
82MMCX-50-0-1
C97
0.01uF
R96
1.33K
R97
QREF
3944(0)
499
R100
10K
C98
0.1uF
+5VI
C96
0.1uF
U19B
AD8052AR
QDATA
3944
R99
0 ohm

FIG. 58


90° Combiner 4110
4108
Q Channel
(RF)
I Channel
4106
U12
0 DEG
90 DEG
IN
GND
ISO
1X603
R56
0 ohm
R59
51
FL1
MDR642E
IN/OUT
GND
GND
IN/OUT
+5V
C71
0.1uF
L10
22nH
C72
0.1uF
C73
470pF
V+
U11
MAAM22010
GND
C75
22pF
J7
82MMCX-50-0-1
RF OUT
3946

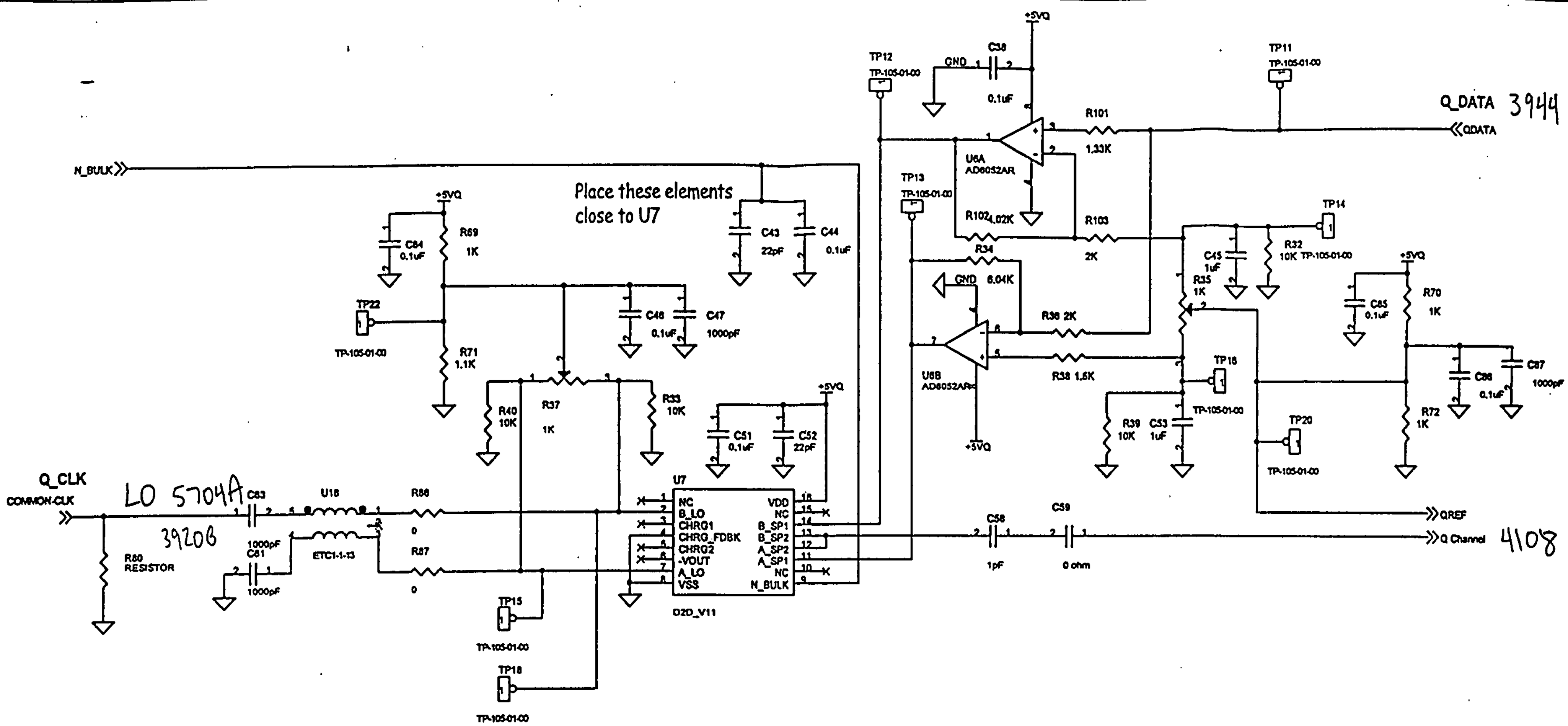

Q_CLK
COMMON-CLK
LO 5704A
39206
R80
RESISTOR
C83
1000pF
C81
1000pF
U18
ETC1-1-13
R86
0
R87
0
TP15
TP-105-01-00
TP18
TP-105-01-00
N_BULK
+5VQ
C84
0.1uF
R69
1K
TP22
TP-105-01-00
R71
1.1K
R40
10K
R37
1K
R33
10K
C46
0.1uF
C47
1000pF
Place these elements
close to U7
C43
22pF
C44
0.1uF
C51
0.1uF
C52
22pF
U7
NC
B_LO
CHRG1
CHRG_FDBK
CHRG2
-VOUT
A_LO
VSS
VDD
NC
B_SP1
B_SP2
A_SP2
A_SP1
NC
N_BULK
D2D_V11
TP12
TP-105-01-00
GND
C38
0.1uF
U6A
AD6052AR
R101
1.33K
TP11
TP-105-01-00
Q_DATA 3944
QDATA
TP13
TP-105-01-00
R102
4.02K
R103
2K
R34
6.04K
U6B
AD6052AR
R36 2K
R38 1.5K
TP14
C45
1uF
R32
10K TP-105-01-00
R35
1K
TP16
TP-105-01-00
R39
10K
C53
1uF
TP20
TP-105-01-00
C85
0.1uF
R70
1K
C86
0.1uF
C87
1000pF
R72
1K
C58
1pF
C59
0 ohm
QREF
Q Channel
4108

FIG 60

Bill Of Materials

Item	Quantity	Reference	Part	Part Number	Manufacturer
1	21	C3,C6,C8,C10,C14,C38,C44,	0.1uF	GRM39X7R104K016	Murata
		C46,C51,C71,C72,C77,C78,			
		C79,C84,C85,C86,C93,C95,			
		C96,C98			
2	6	C5,C7,C15,C43,C52,C75	22pF	GRM39COG220J050	Murata
3	5	C9,C16,C45,C53,C89	1uF	GRM40Y5V105Z016	Murata
4	8	C11,C23,C25,C47,C61,C63,	1000pF	GRM39X7R102K050	Murata
		C80,C87			
5	2	C58,C21	1pF	GRM39COG010B50V	Murata
6	2	C82,C33	4.7uF	T491A475K006AS	KEMET
7	2	C59,C35	0 ohm	GRM39COGxxxx50V	Murata
8	1	C73	470pF	GRM39COG471J050	Murata
9	1	C83	1uF	T491A105M016AS	Kemet
10	3	C90,C91,C92	100pF	ECU-V1H101JCV	
11	2	C94,C97	0.01uF	GRM39X7R103K016	Murata
12	1	FL1	MDR642E	MDR642E	Soshin
13	1	JP1	Shunt	69190-402	BERG
14	1	JP2	69190-403	69190-403	BERG
15	4	J7,J8,J9,J10	82MMCX-50-0-1	82MMCX-50-0-1	Suhner
16	1	L10	22nH	LL1608-F22NK	Coilcraft
17	1	L12	BLM11A121S	BLM11A121S	Murata
18	1	L13	330nH	LL2012-FR33K	
19	10	R5,R6,R12,R13,R32,R33,	10K	ERJ3EKF1002	Panasonic
		R39,R40,R95,R100			
20	2	R34,R7	6.04K	ERJ3EKF6041	Panasonic
21	4	R8,R10,R35,R37	1K	3224W-1-102	Bourns
22	4	R9,R36,R90,R103	2K	ERJ3EKF2001	Panasonic
23	2	R38,R11	1.5K	ERJ3EKF1501	Panasonic
24	3	R56,R94,R99	0 ohm	ERJ3GSY0R00	Panasonic
25	1	R59	51	ERJ3GSYJ510	Panasonic
26	7	R60,R61,R62,R84,R85,R86,	0	ERJ3GSY0R00	Panasonic
		R87			
27	6	R63,R64,R66,R69,R70,R72	1K	ERJ3EKF1001	Panasonic
28	2	R71,R65	1.1K	ERJ3EKF1101	Panasonic
29	2	R80,R79	RESISTOR		
30	3	R81,R82,R83	R		
31	4	R88,R91,R96,R101	1.33K	ERJ3EKF1331	Panasonic
32	2	R102,R89	4.02K	ERJ3EKF4021	Panasonic
33	2	R92,R97	499	ERJ3EKF4990	Panasonic
34	19	TP1,TP2,TP3,TP4,TP5,TP6,	TP-105-01-00		

FIG. 6lA

		TP8,TP9,TP11,TP12,TP13,			
		TP14,TP15,TP16,TP18,TP19,			
		TP20,TP21,TP22			
35	3	U1,U6,U19	AD8052AR	AD8052AR	Analog Devices
36	2	U7,U2	D2D_V11	D2D_V11	Parker Vision
37	1	U11	MAAM22010	MAAM22010	MACOM
38	1	U12	1X603	1X603	Anaren
39	1	U14	AD1582	AD1582	Analog Devices
40	1	U15	UPG1678	UPG1678GV	NEC
41	1	U16	ADP-2-10-75	ADP-2-10-75	Mini-Circuits
42	1		BOARD	B500.641.021	V05.10

FIG. 61B

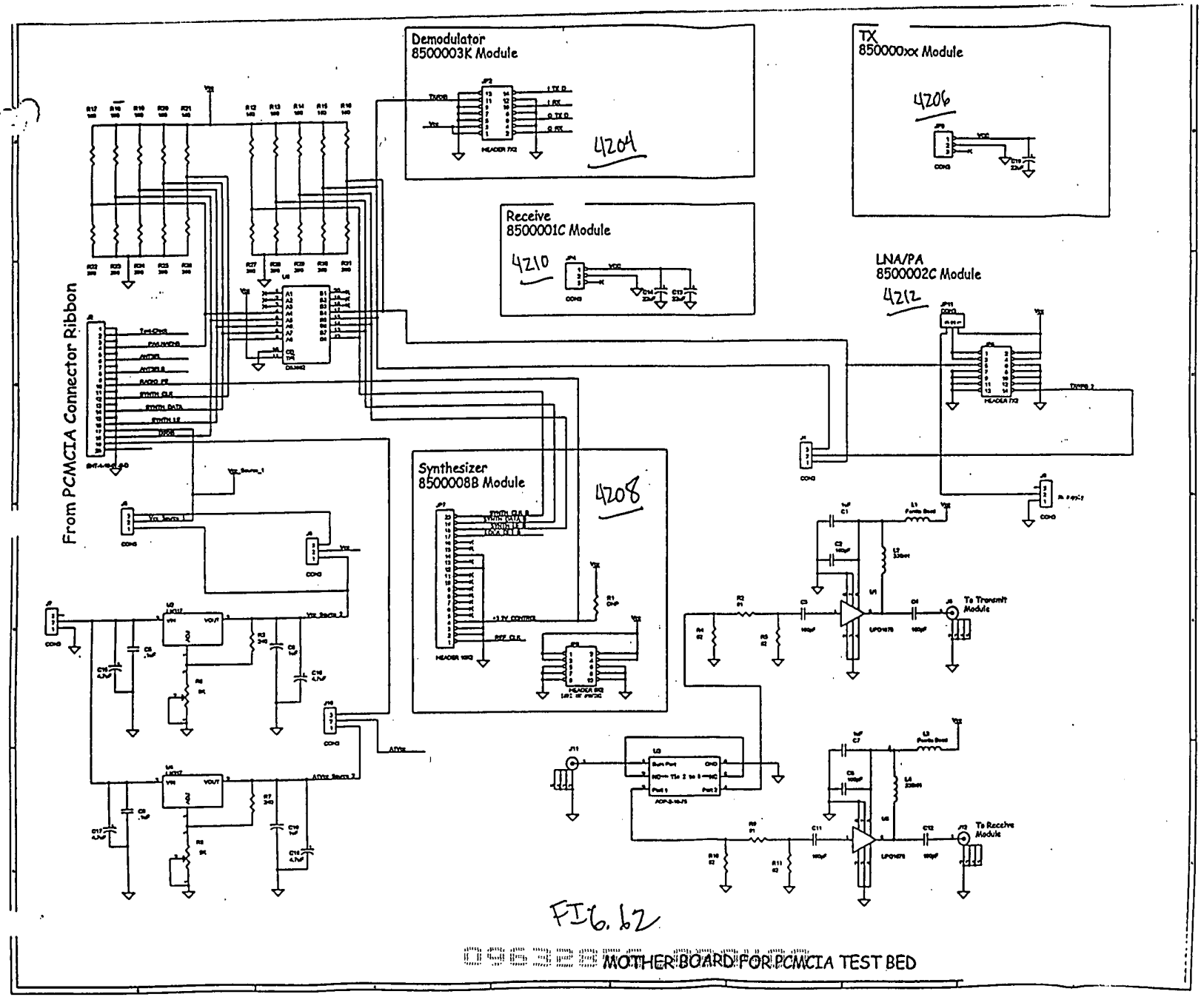


FIG. 62

MOTHER BOARD FOR PCMCIA TEST BED

Bill Of Materials

Item	Qty	Reference	Part	Description	Part Number	Vendor
1	4	C1,C6,C7,C10	1uF	Cap, 1uF, +80-20%, 0805	GRM40Y5V105Z016AD	Murata
2	6	C2,C3,C4,C8,C11,C12	100pF	Cap, 100pF, 5%, COG, 0603	ECU-V1H101JCV	Panasonic
3	2	C5,C9	.1uF	Cap, .1uF, +80-20%, Y5V, 0603		Murata
4	3	C13,C14,C19	22uF	Cap, Tant, 22uF, 20%, 20V	T491D226M020AS	Kemet
5	4	C15,C16,C17,C18	4.7uF	Cap, Tant, 4.7uF, 20%, 20V	T491C475M020AS	Kemet
6	2	JP2,JP6	HEADER 7X2	Receptacle, 7x2pin, .050	SFMC-107-L1-S-D	Samtek
7	9	JP4, J4, J5, J6, J7, JP9, J9, J10, JP11	CON3	Header, 3pin, .100"	69190-403	Berg
8	1	JP7	HEADER 10X2	Receptacle, 10x2pin, .050	SFMC-110-L1-S-D	Samtek
9	1	JP8	HEADER 5X2	Receptacle, 5x2pin, .050	SFMC-105-L1-S-D	Samtek
10	1	J2	EHT-1-10-01-S-D	Header, ribbon, 10x2pin, 2mm	EHT-1-10-01-S-D	Samtek
11	3	J8,J11,J12	82MMCX-50-0-1	Connector, RF	82MMCX-50-0-1	Suhner
12	2	L3,L1	Ferrite Bead	Ferrite Bead, 0805	BLM21A121S	Murata
13	2	L4,L2	330nH	Ind, 330nH, 10%, 0805	LL2012-FR33K	Toko
14	1	R1	DNP	Res, 0603		Panasonic
15	2	R9,R2	91	Res, 91 Ohm, 5%, 0603	ERJ-3GSYJ910	Panasonic
16	2	R7,R3	240	Res, 240 Ohm, 5%, 0603	ERJ-3GSYJ241	Panasonic
17	4	R4,R5,R10,R11	82	Res, 82 Ohm, 5%, 0603	ERJ-3GSYJ820	Panasonic
18	2	R8,R6	5K	Var Res, 5K, 10%	3296W001502	Bourns
19	10	R12, R13, R14, R15, R16, R17, R18, R19, R20, R21	180	Res, 180 Ohm, 5%, 0603	ERJ-3GSYJ181	Panasonic
20	10	R22, R23, R24, R25, R26, R27, R28, R29, R30, R31	390	Res, 390 Ohm, 5%, 0603	ERJ-3GSYJ391	Panasonic
21	2	U5,U1	UPG1678	IC, RF Buffer	UPG1678GV	NEC
22	2	U4,U2	LM317	IC, Voltage Regulator	LM317T	National
23	1	U3	ADP-2-10-75	RF Splitter	ADP-2-10-75	MiniCircuits
24	1	U6	DS3862	IC, Buffer	DS3862WM	National

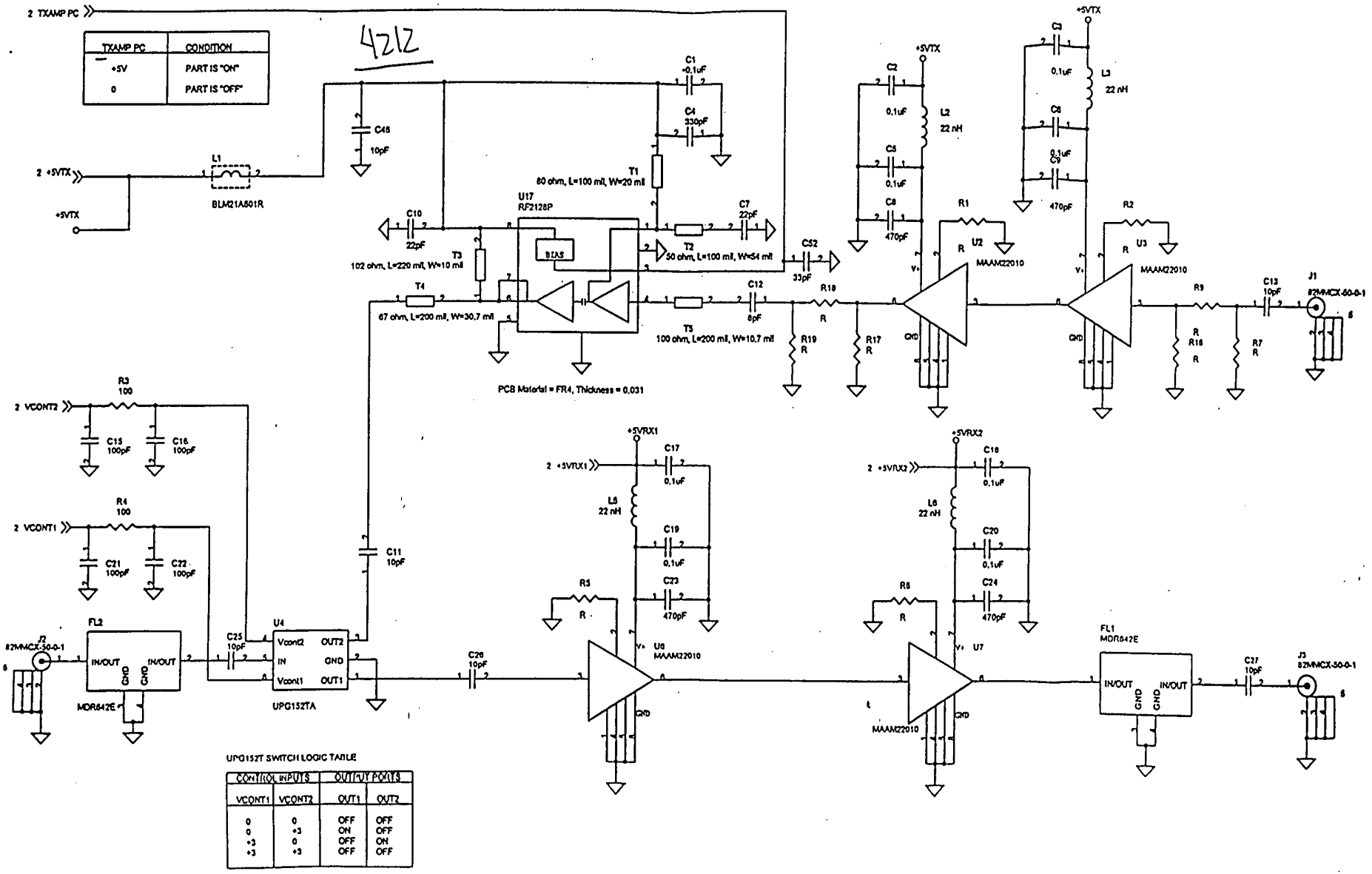
25 1

BOARD

STB500.641.023 VOL 01

FIG. 63

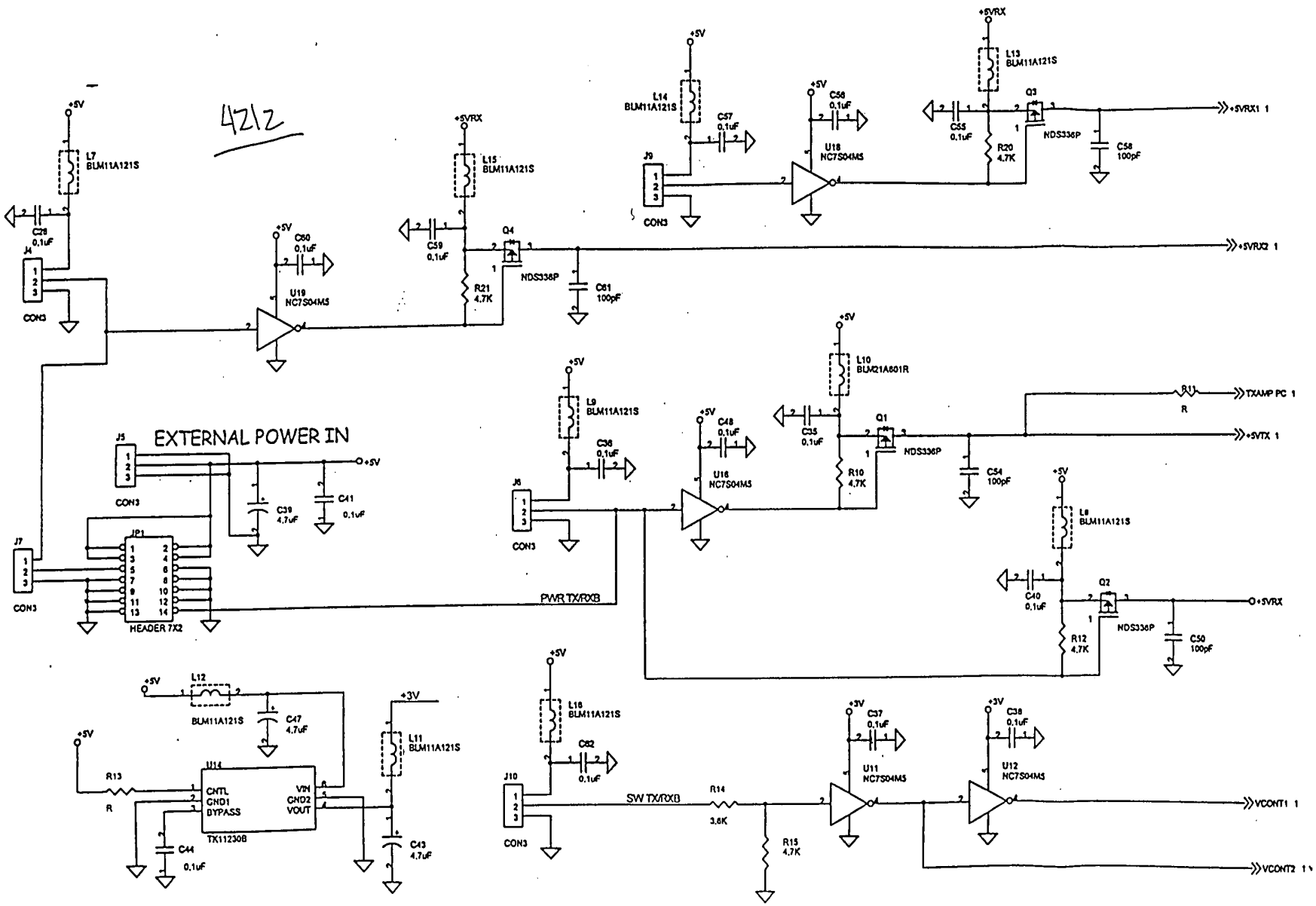
FIG. 64



UPG152T SWITCH LOGIC TABLE

CONTROL INPUTS		OUTPUT PORTS	
VCONT1	VCONT2	OUT1	OUT2
0	0	OFF	OFF
0	+3	ON	OFF
+3	0	OFF	ON
+3	+3	OFF	OFF

FIG. 65


4212
EXTERNAL POWER IN
PWR TX/RXB
SW TX/RXB
HEADER 7X2
TX11230B
NDS336P
NC7S04M5
BLM11A121S
BLM21A601R
CON3
+5V
+3V
+5VRX
TXAMP PC 1
+5VTX 1
+5VRX1 1
+5VRX2 1
VCONT1 1
VCONT2 1

S

Bill Of Materials

Item	Qty	Reference	Part	Manufacturer	Part Description	Part Number
1	24	C1,C2,C3,C5,C6,C17,C18,	0.1uF	Murata	.1uF,0603,X7R,20%,16V	GRM39X7R104MO16
		C19,C20,C28,C35,C36,C37,				
		C38,C40,C41,C44,C48,C55,				
		C56,C57,C59,C60,C62				
2	1	C4	330pF	Murata	330pF,0603,COG,10%,50	GRM39COG331K050
3	2	C10,C7	22pF	Murata	22pF,0603,COG,10%,50	GRM39COG220K050
4	4	C8,C9,C23,C24	470pF	Murata	470pF,0603,COG,10%,50	GRM39COG471K050
5	6	C11,C13,C25,C26,C27,C46	10pF	Murata	10pF,0603,COG,10%,50	GRM39COG100K050
6	1	C12	8pF	Murata	8pF,0603,COG,10%,50	GRM39COG080K050
7	8	C15,C16,C21,C22,C50,C54,	100pF	Murata	100pF,0603,COG,10%,50	GRM39COG101K050
		C58,C61				
8	3	C39,C43,C47	4.7uF	Panasonic	4.7 uF tantalum, 16V	ECS-T1CY475R
9	1	C52	33pF	Murata	330pF,0603,COG,10%,50	GRM39COG330K050
10	2	FL1,FL2	MDR642E	Soshin	2.4-2.5GHz BPF	MDR642E
11	1	JP1	HEADER 7X2	Samtec	Dual Row, 7 pins per row	FTSH-107-01-F-D
12	3	J1,J2,J3	82MMCX-50-0-1	Suhner	RF Connector	82MMCX-50-0-1
13	6	J4,J5,J6,J7,J9,J10	CON3	Berg	3 pin header w retentive leg	69190-403H
14	2	L10,L1	BLM21A601R	Murata	600 ohms@100MHz, 500 mA Ferrite Bead	BLM21A601R
15	4	L2,L3,L5,L6	22 nH	Coilcraft	22nH, 0805CS (2012), 5%	0805CS-220X-BC
16	9	L7,L8,L9,L11,L12,L13,L14,	BLM11A121S	Murata	RF Bead	BLM11A121S
		L15,L16				
17	4	Q1,Q2,Q3,Q4	NDS336P	National	P-Channel FET	NDS336P
18	12	R1,R2,R5,R6,R7,R9,R11,	R	Panasonic		
		R13,R16,R17,R18,R19				
19	2	R3,R4	100	Panasonic	0603, 100, 5%, 1/16 W	ERJ-3GSY-J-101
20	5	R10,R12,R15,R20,R21	4.7K	Panasonic	0603, 4.7K, 5%, 1/16 W	ERJ-3GSY-J-472
21	1	R14	3.6K	Panasonic	0603, 3.6K, 5%, 1/16 W	ERJ-3GSY-J-362
22	1	T1	80 ohm, L=100 mil, W=20 mil		80 ohm, L=100 mil, W=20 mil	
23	1	T2	50 ohm, L=100 mil, W=54 mil		50 ohm, L=100 mil, W=54 mil	
24	1	T3	102 ohm, L=220 mil, W=10 mil		102 ohm, L=220 mil, W=10 mil	
25	1	T4	67 ohm, L=200 mil, W=30.7 mil		67 ohm, L=200 mil, W=30.7 mil	
26	1	T5	100 ohm, L=200 mil, W=10.7 mil		100 ohm, L=200 mil, W=10.7 mil	
27	4	U2,U3,U6,U7	MAAM22010	MACOM	2.4-2.5 GHz LNA	MAAM22010
28	1	U4	UPG152TA	NEC	RF Switch	UPG152TA
29	5	U11,U12,U16,U18,U19	NC7S04M5	National	Inverter	NC7S04M5
30	1	U14	TK11230B	TOKO	Voltage Regulator	TK11230B
31	1	U17	RF2128P	RFMD	Medium Power Linear Amplifier	RF2128P

FIG. 66

32 /

B500.641.024 V01.

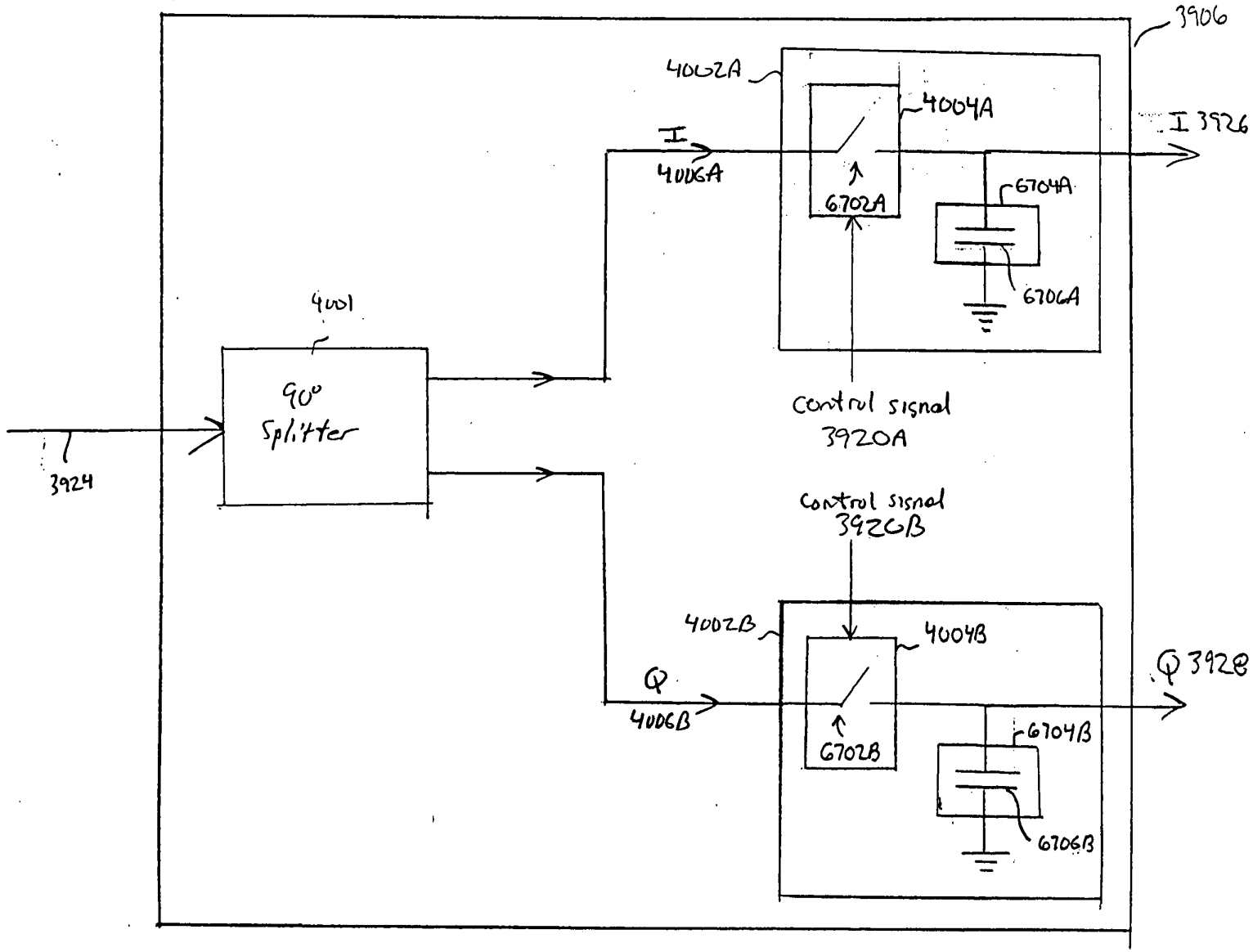

3906
4002A
4004A
I 3926
I
4006A
6702A
6704A
6706A
4001
90°
Splitter
3924
Control signal
3920A
Control signal
3920B
4002B
4004B
Q 3928
Q
4006B
6702B
6704B
6706B

FIG. 67A

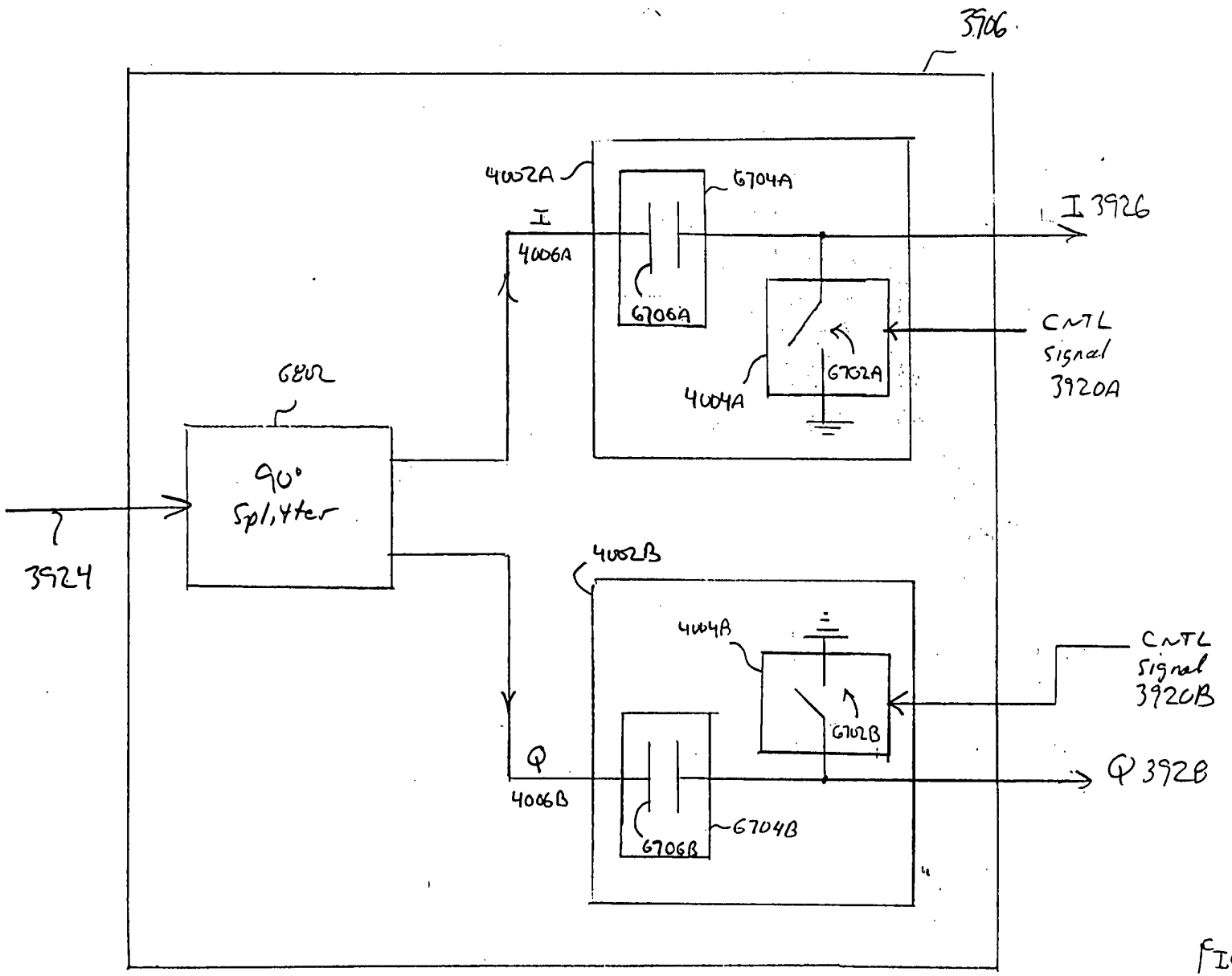


FIG. 67B

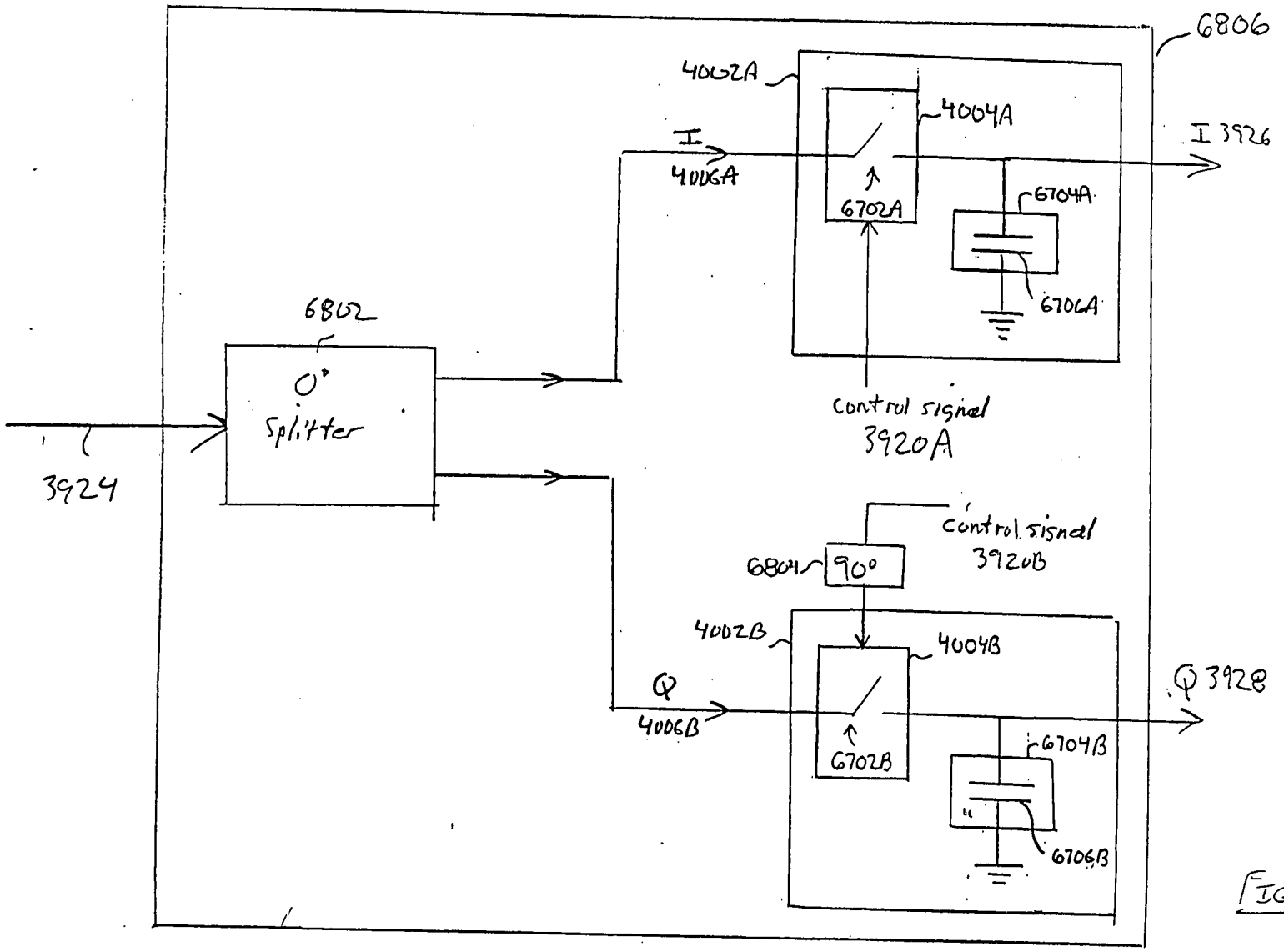

6806
4002A
4004A
I 3926
I
4006A
6702A
6704A
6706A
6802
0°
Splitter
3924
control signal
3920A
control signal
3920B
6804
90°
4002B
4004B
Q
4006B
Q 3928
6702B
6704B
6706B

FIG. 68A

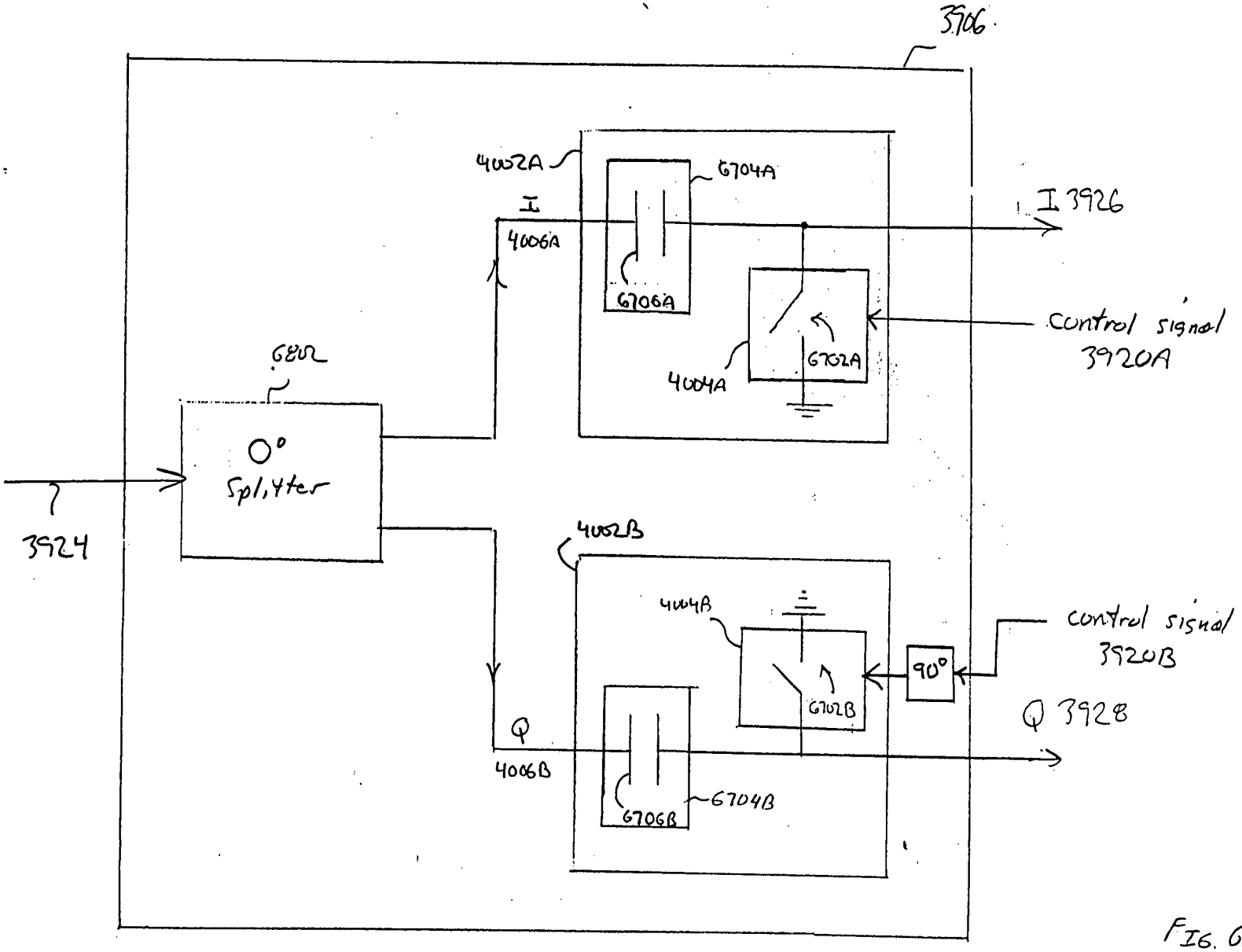


FIG. 68B

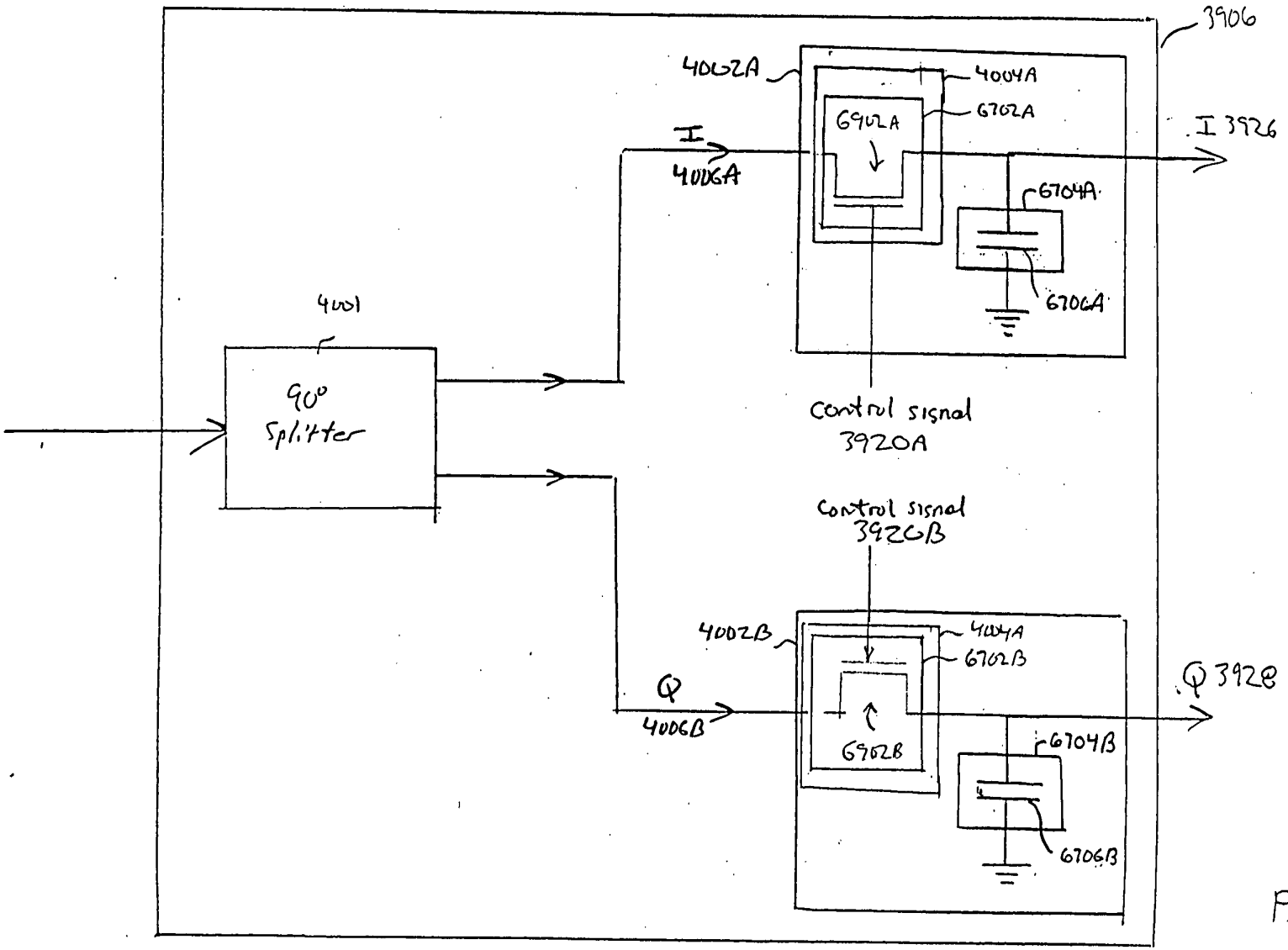


FIG. 69A

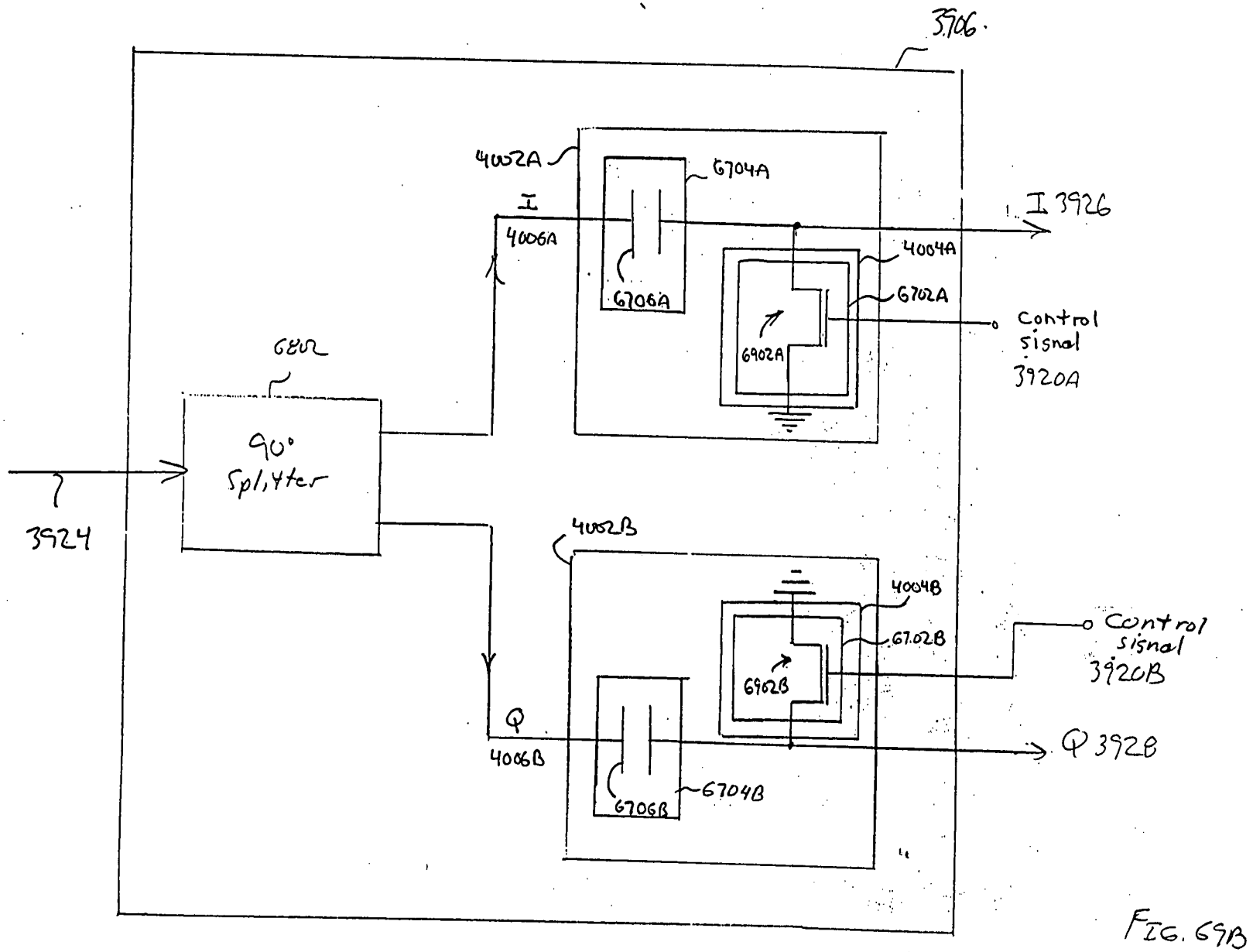


FIG. 69B

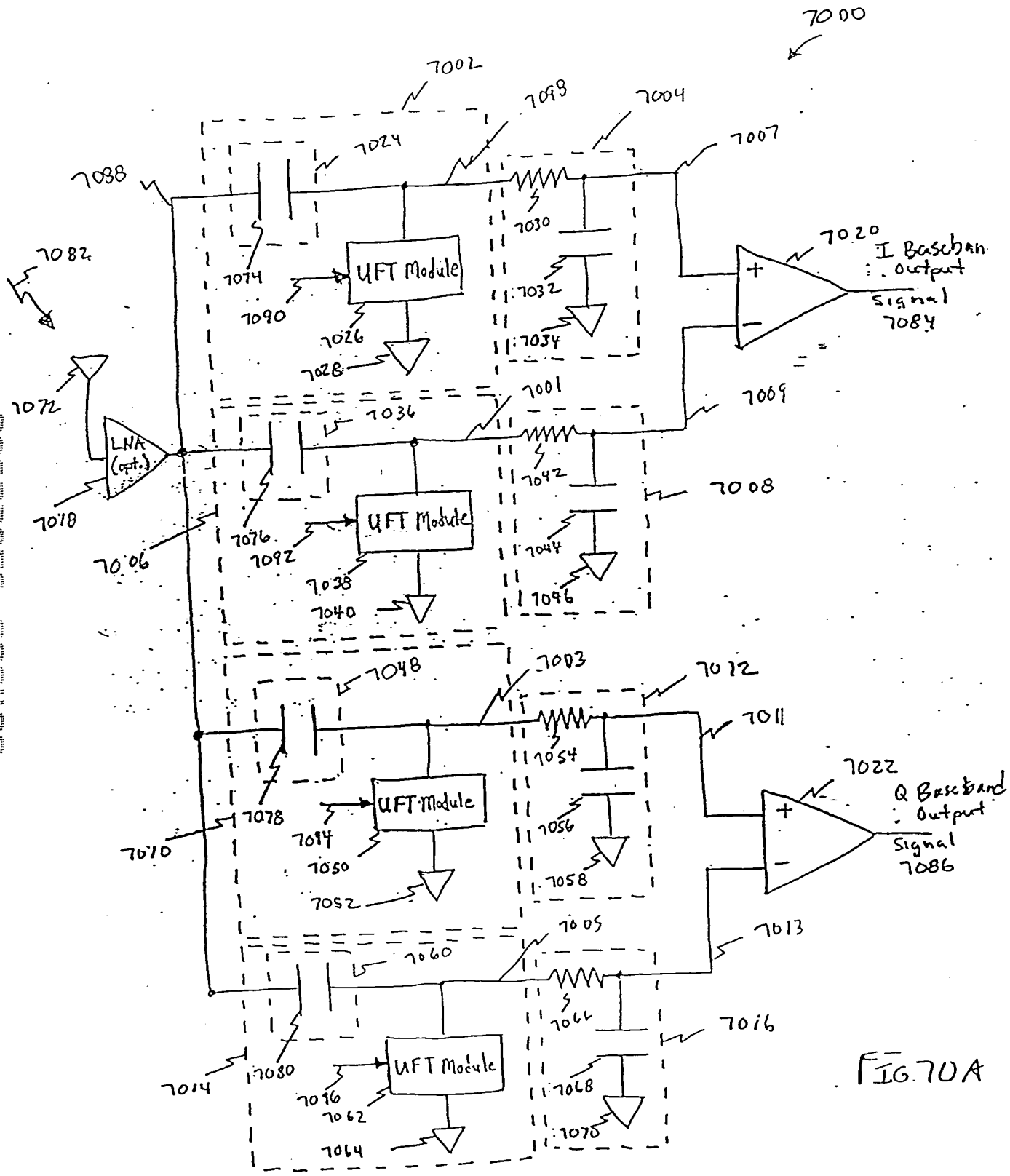

7000
7002
7003
7004
7005
7007
7008
7009
7011
7012
7013
7014
7016
7018
7020
I Baseband output signal 7084
7022
Q Baseband output signal 7086
7024
7026
7028
7030
7032
7034
7036
7038
7040
7042
7044
7046
7048
7050
7052
7054
7056
7058
7060
7062
7064
7066
7068
7070
7072
7074
7076
7078
7080
7082
7084
7086
7088
7090
7092
7094
7096
7098
7001
LNA (opt.)
UFT Module
UFT Module
UFT Module
UFT Module

FIG. 7A

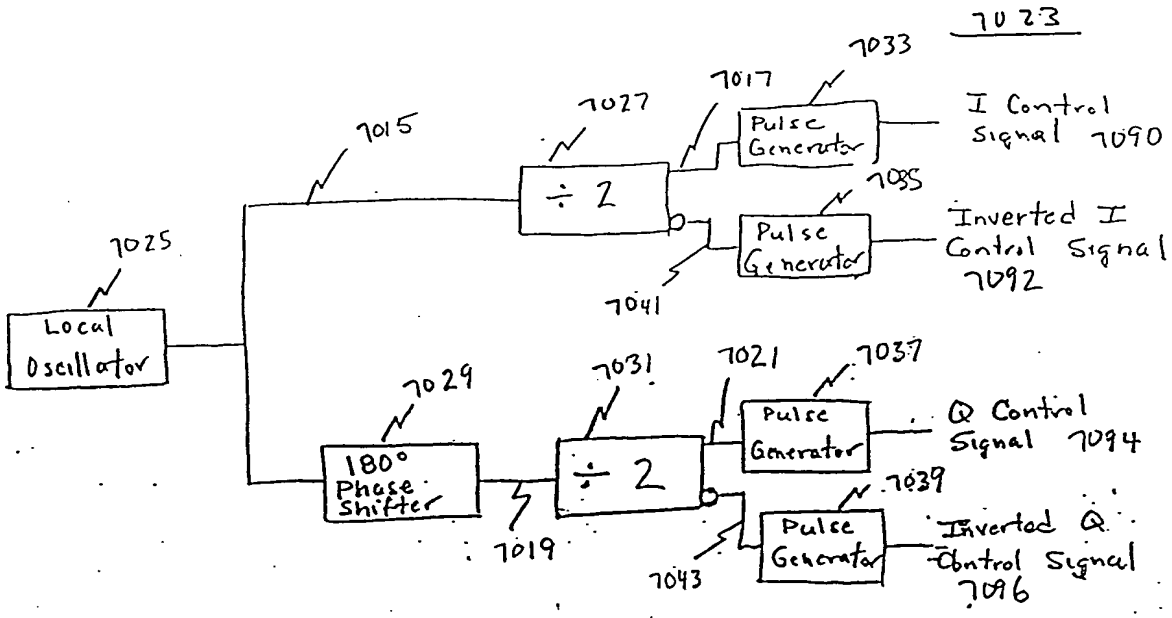


FIG. 70B

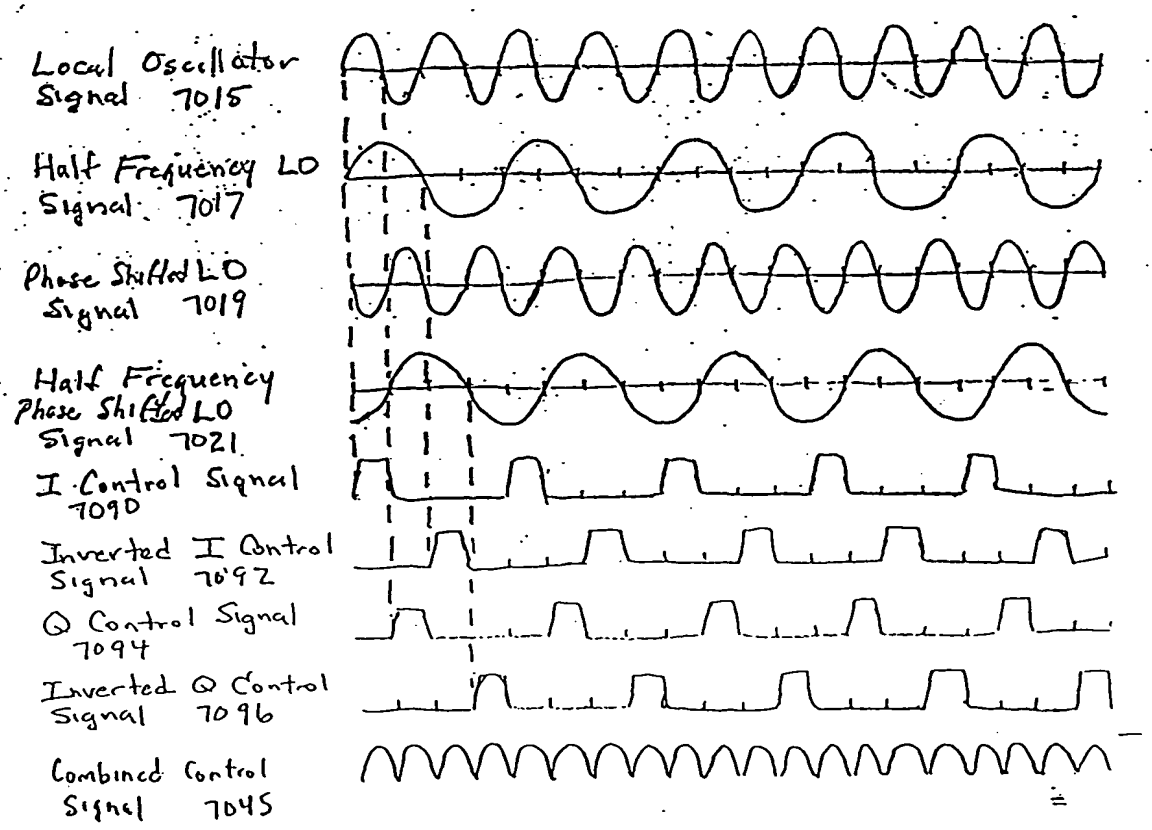


FIG. 70C

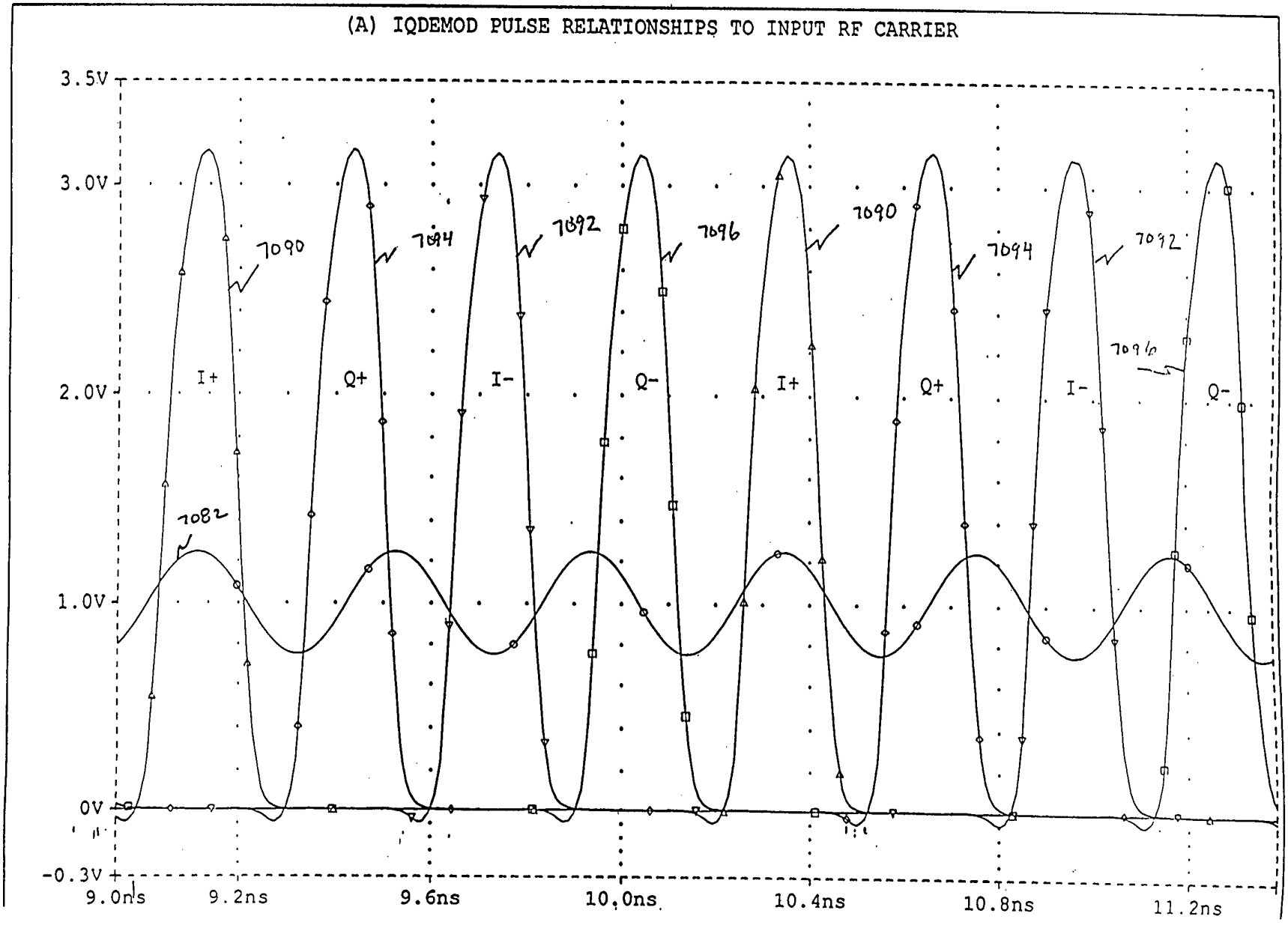

(A) IQDEMOD PULSE RELATIONSHIPS TO INPUT RF CARRIER
3.5V
3.0V
2.0V
1.0V
0V
-0.3V
9.0ns
9.2ns
9.6ns
10.0ns
10.4ns
10.8ns
11.2ns
7090
7094
7092
7096
7090
7094
7092
7096
7082
I+
Q+
I-
Q-
I+
Q+
I-
Q-

FIG. 70D

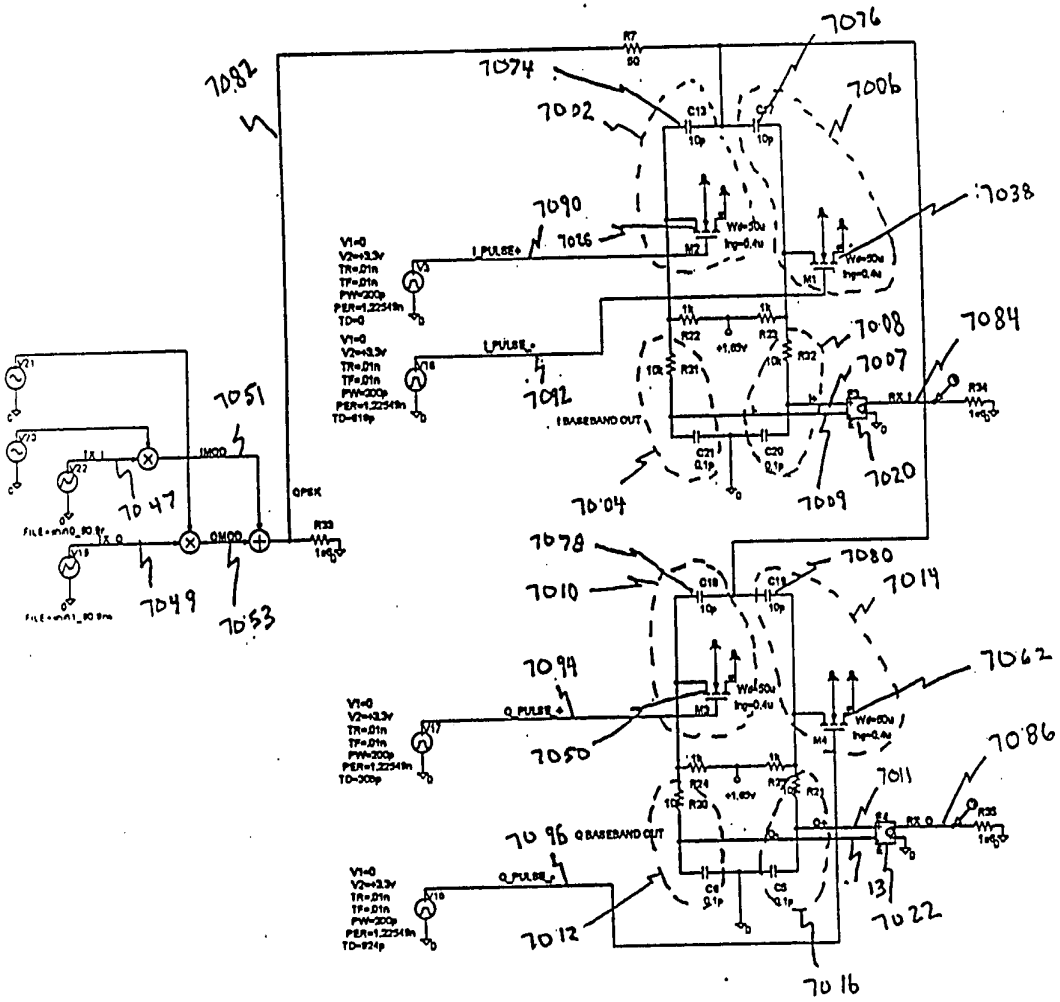
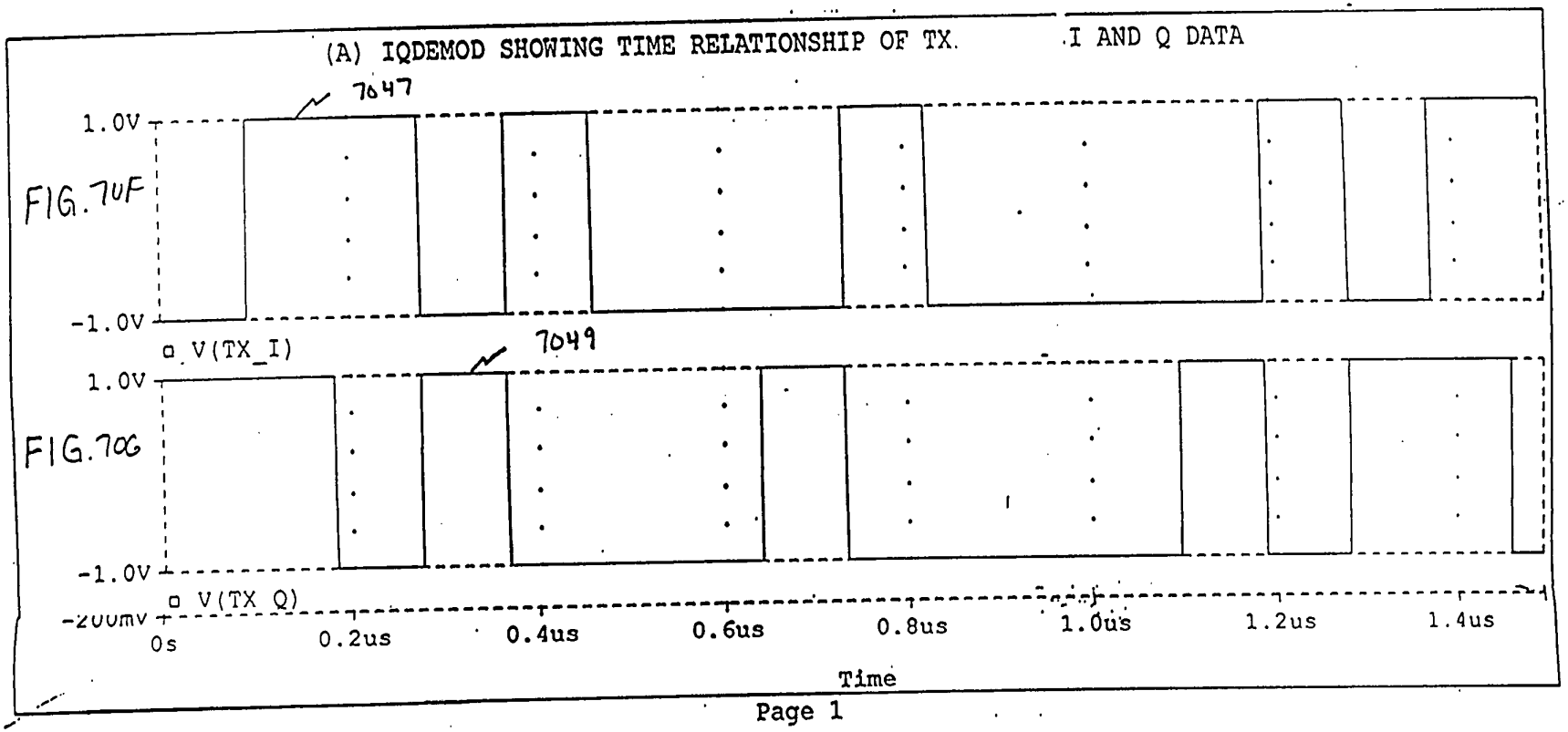
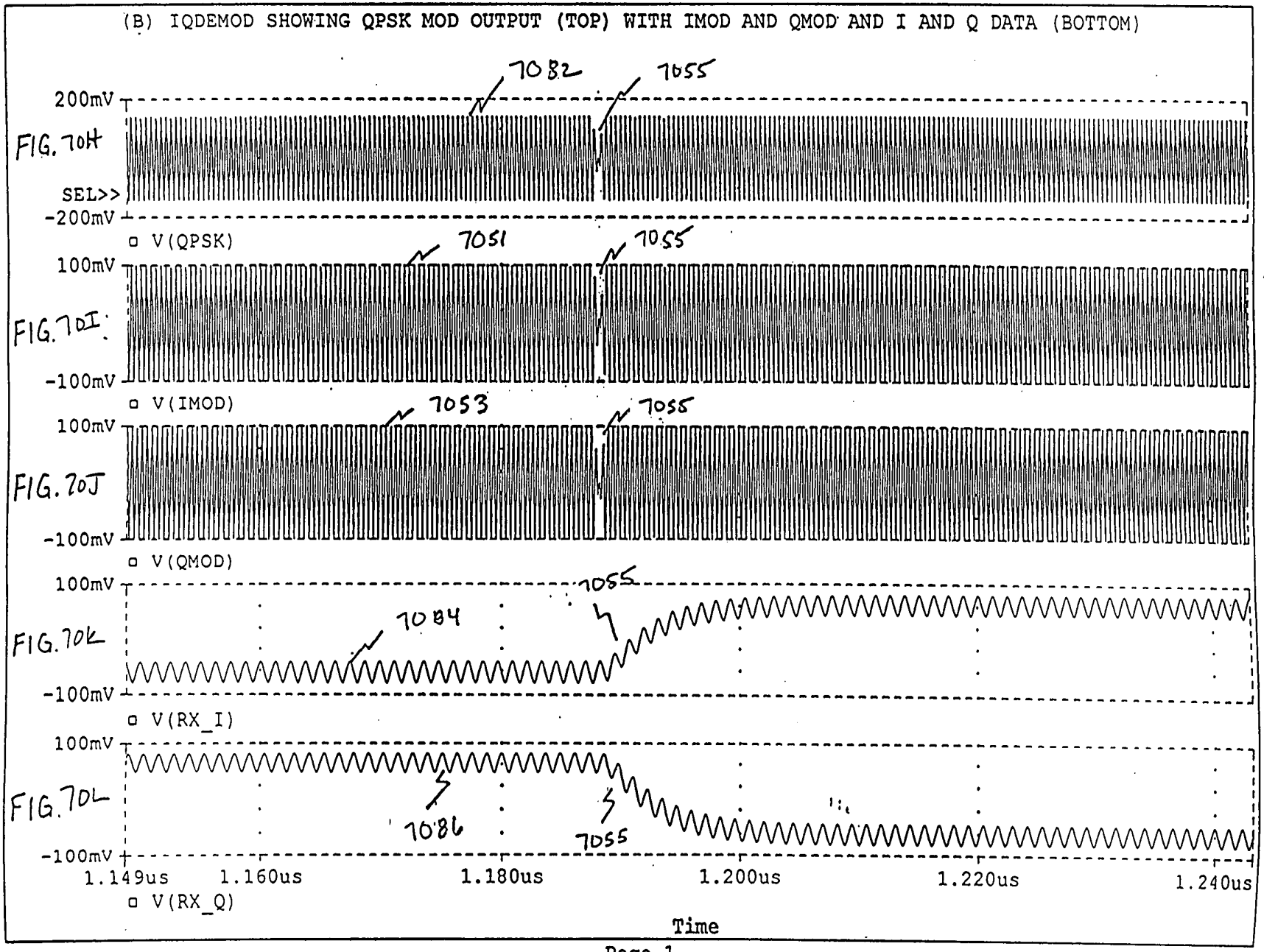
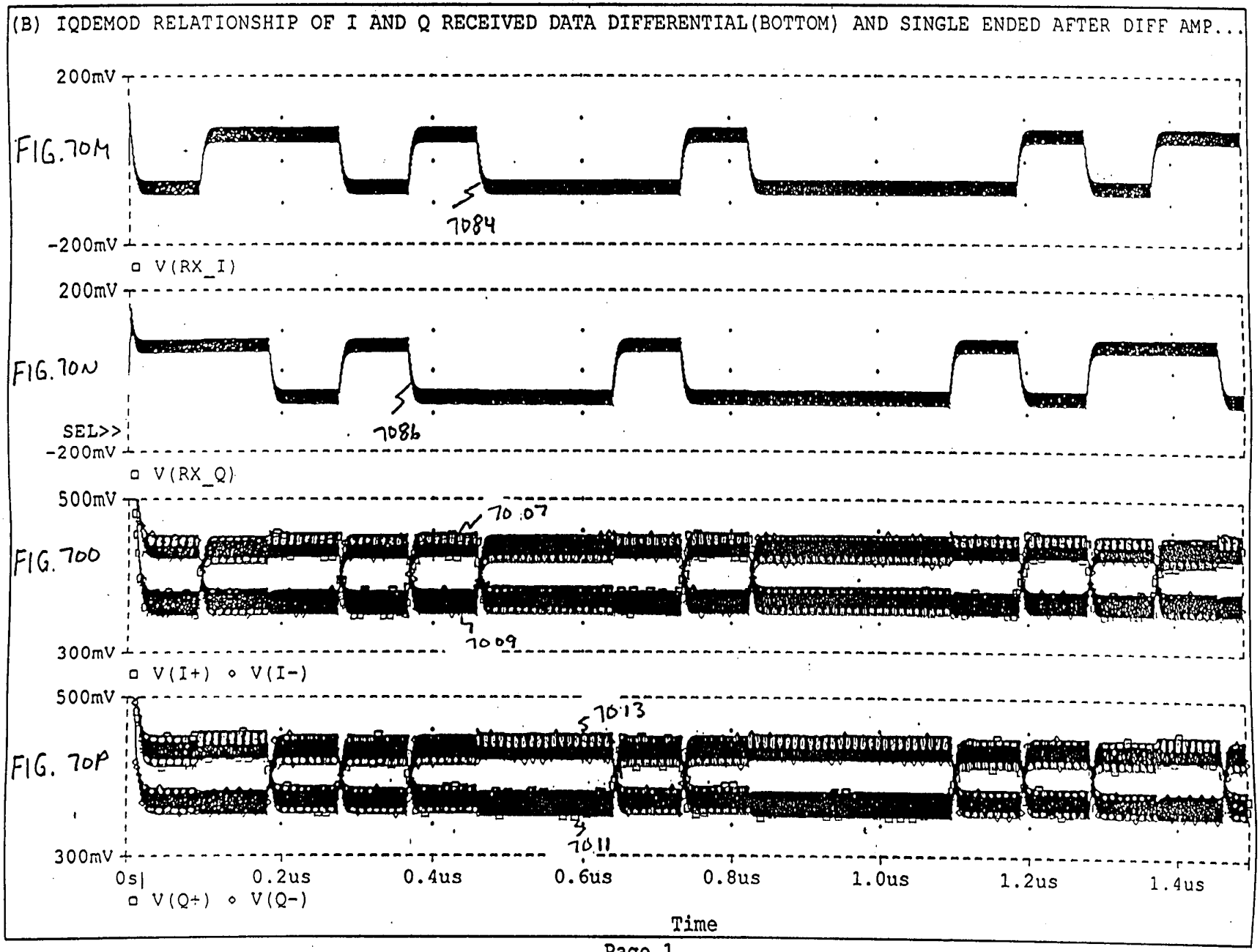

21900
7076
7074
7006
7092
7002
7038
7090
7026
7084
7008
7007
7092
7051
7004
7009
7020
7078
7080
7010
7014
7062
7094
7050
7086
7011
7096
7013
7022
7012
7016
7047
7049
7053

FIG. 70E


(A) IQDEMOD SHOWING TIME RELATIONSHIP OF TX. .I AND Q DATA
7047
1.0V
FIG. 7UF
-1.0V
V(TX_I)
7049
1.0V
FIG. 7UG
-1.0V
V(TX_Q)
-200mV
0s
0.2us
0.4us
0.6us
0.8us
1.0us
1.2us
1.4us
Time


(B) IQDEMOD SHOWING QPSK MOD OUTPUT (TOP) WITH IMOD AND QMOD AND I AND Q DATA (BOTTOM)
7082
7055
200mV
FIG. 70H
SEL>>
-200mV
V(QPSK)
7051
7055
100mV
FIG. 70I
-100mV
V(IMOD)
7053
7055
100mV
FIG. 70J
-100mV
V(QMOD)
100mV
7055
7084
FIG. 70K
-100mV
V(RX_I)
100mV
FIG. 70L
7086
7055
-100mV
1.149us
1.160us
1.180us
1.200us
1.220us
1.240us
V(RX_Q)
Time

Page 1


(B) IQDEMOD RELATIONSHIP OF I AND Q RECEIVED DATA DIFFERENTIAL(BOTTOM) AND SINGLE ENDED AFTER DIFF AMP...
200mV
FIG. 70M
7084
-200mV
V(RX_I)
200mV
FIG. 70N
7086
SEL>>
-200mV
V(RX_Q)
500mV
FIG. 700
7007
7009
300mV
V(I+) V(I-)
500mV
FIG. 70P
7013
7011
300mV
0s
0.2us
0.4us
0.6us
0.8us
1.0us
1.2us
1.4us
V(Q+) V(Q-)
Time

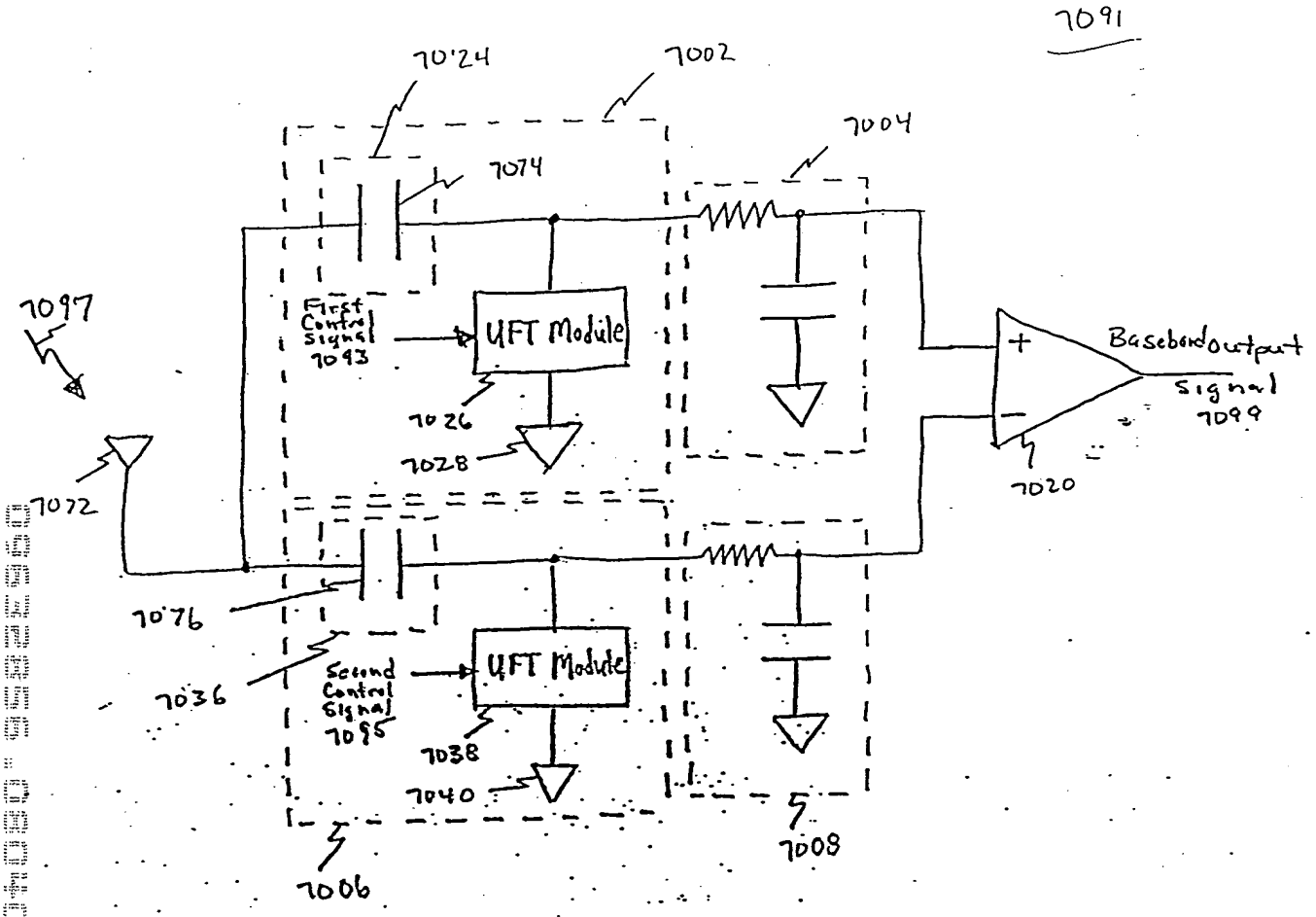

7091
7024
7002
7004
7074
7097
First Control Signal 7093
UFT Module
7026
7028
7072
Baseband output signal 7099
7020
7076
7036
Second Control Signal 7095
UFT Module
7038
7040
7008
7006

FIG. 70Q

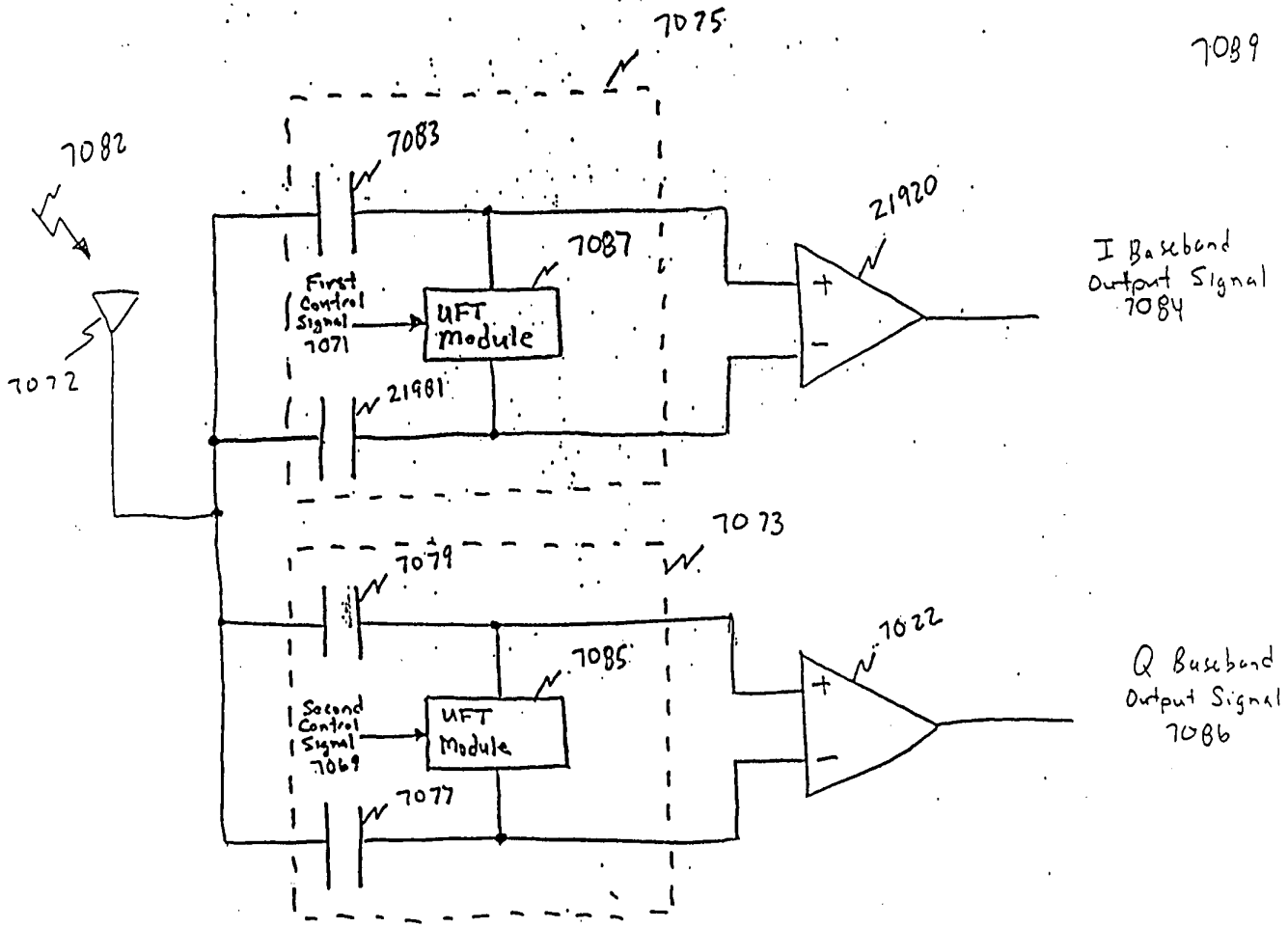

7075
7089
7082
7083
21920
7087
First Control Signal 7071
UFT Module
I Baseband output Signal 7084
7072
21981
7073
7079
7022
7085
Second Control Signal 7069
UFT Module
Q Baseband Output Signal 7086
7077

FIG. 70 R

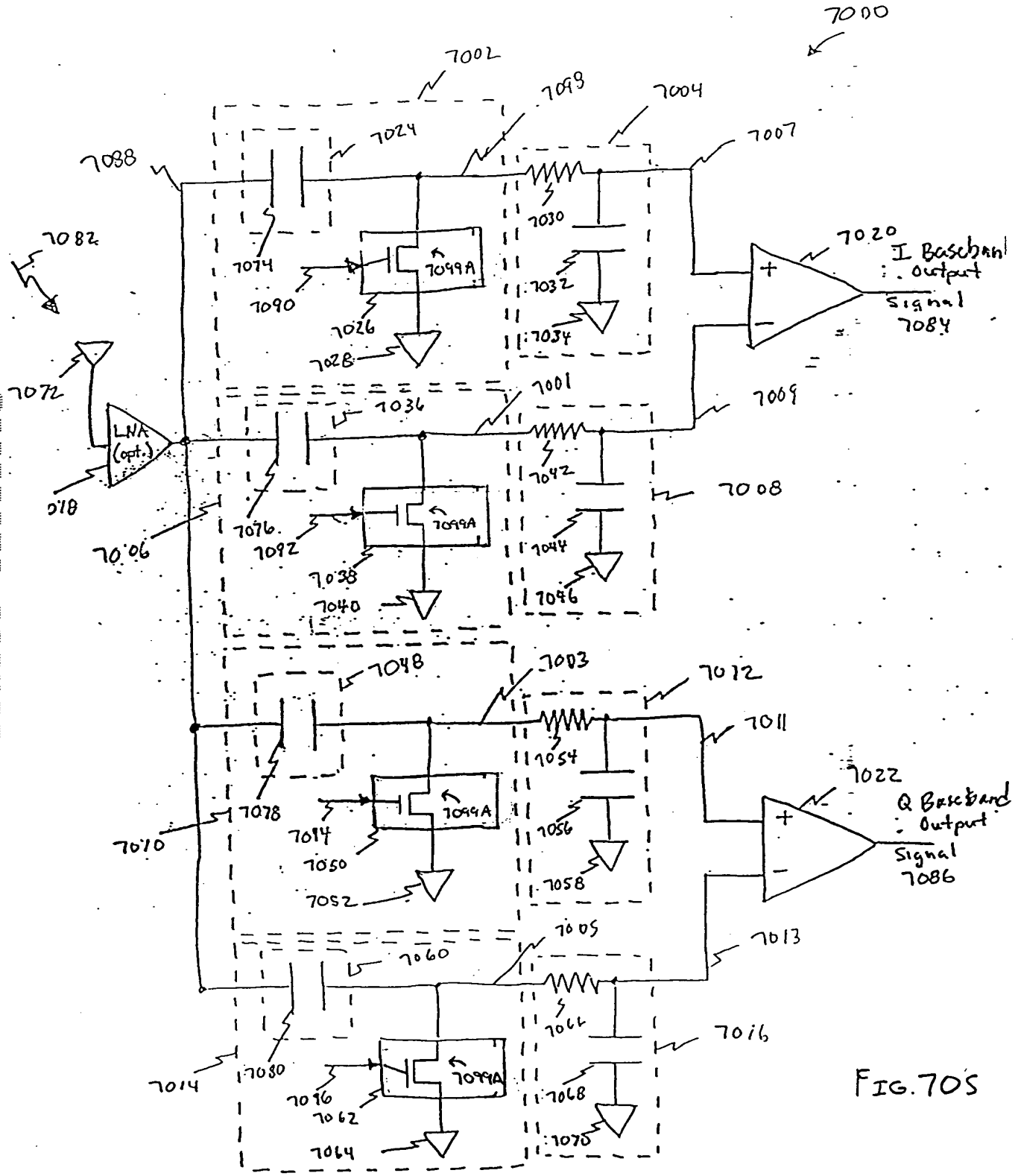

7000
7002
7004
7088
7024
7007
7030
7082
7074
7020
I Baseband Output Signal 7084
7090
7099A
7032
7026
7034
7028
7072
7001
7009
7036
LNA (opt.)
7042
7008
7018
7076
7044
7006
7092
7038
7046
7040
7048
7003
7012
7011
7054
7022
Q Baseband Output Signal 7086
7078
7056
7010
7014
7050
7058
7052
7005
7013
7060
7044
7016
7014
7080
7066
7096
7062
7068
7064
7070

FIG. 7O5

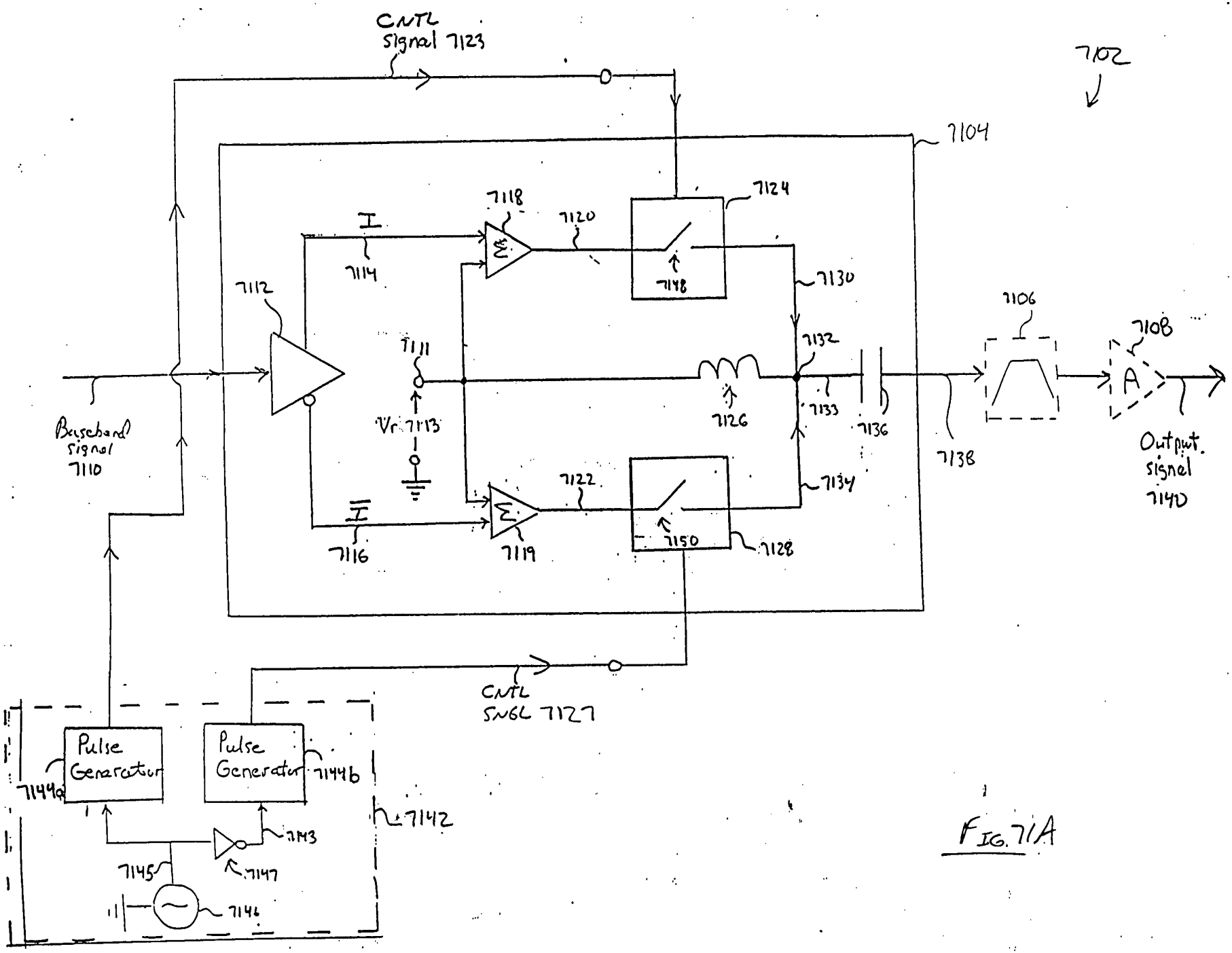

CNTL
Signal 7123
7102
7104
7118
7120
7124
I
7114
7148
7112
7130
7106
7108
7111
7132
Vr 7113
7126
7133
7136
Baseband
Signal
7110
7138
Output
signal
7140
7122
7134
7116
7119
7150
7128
CNTL
SWCL 7127
Pulse
Generator
7144a
Pulse
Generator
7144b
7142
7143
7145
7147
7146

FIG. 71A

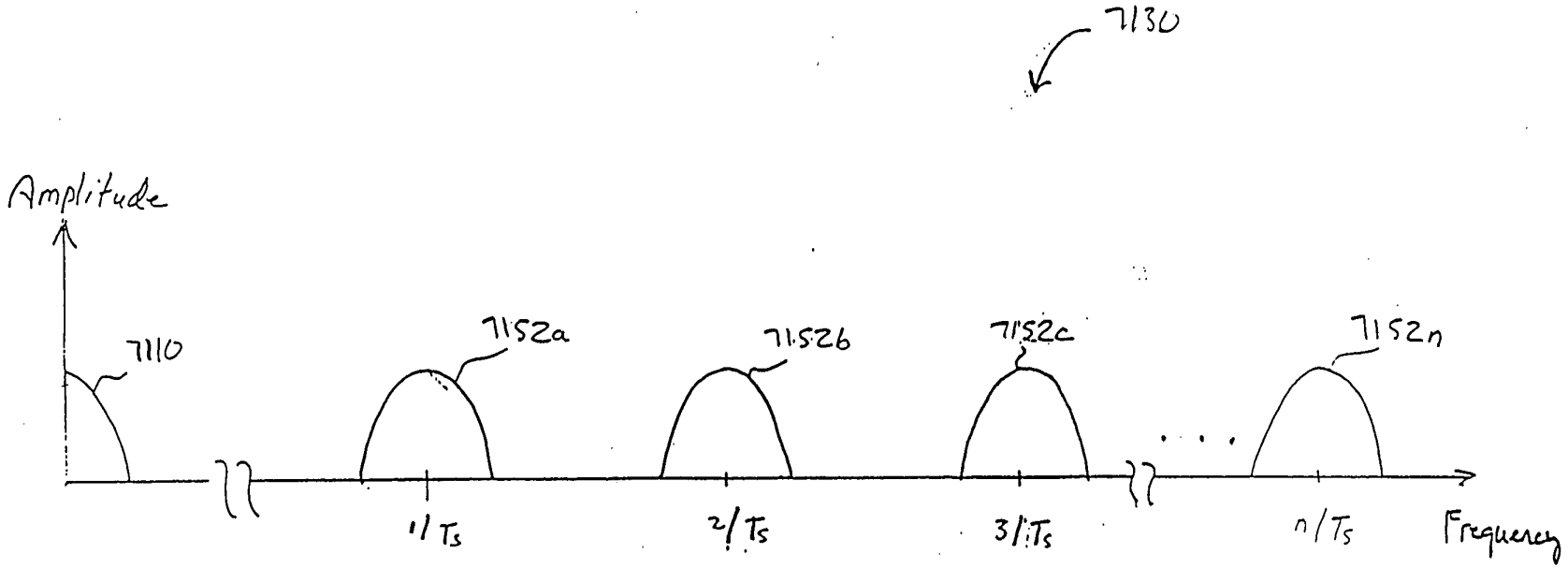

7130
Amplitude
7110
7152a
7152b
7152c
7152n
1/Ts
2/Ts
3/Ts
n/Ts
Frequency

FIG. 7B

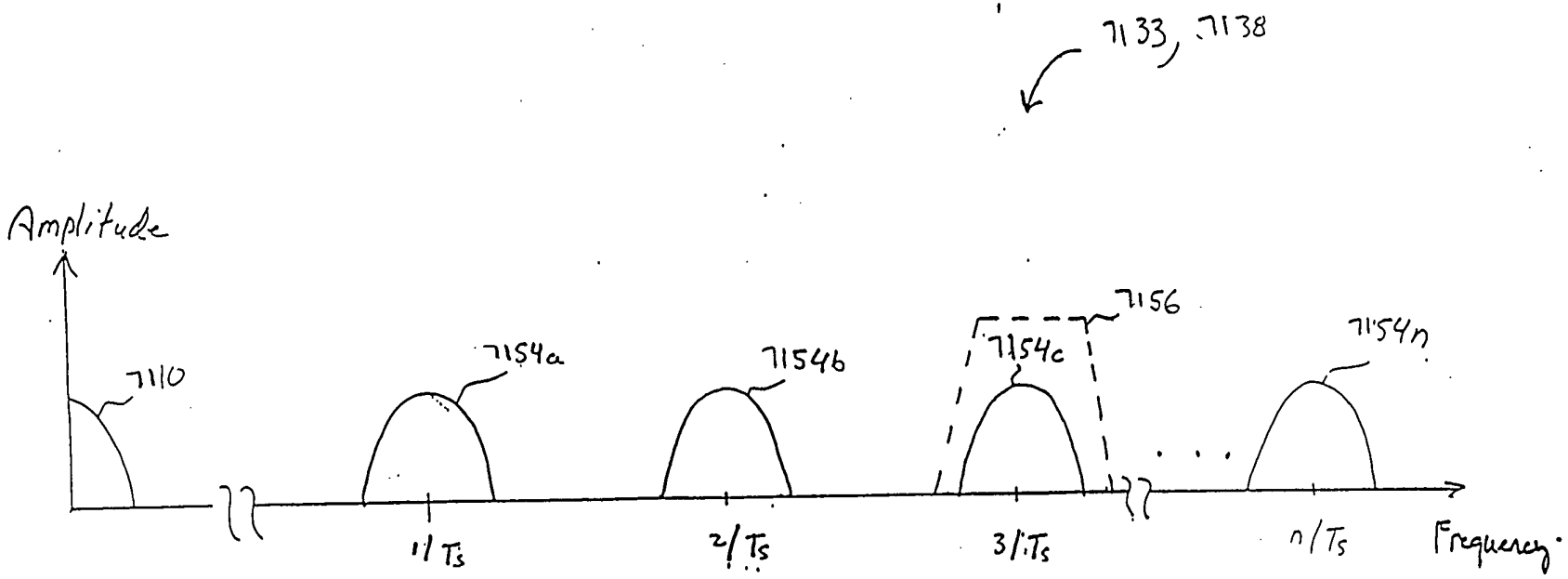

7133, 7138
Amplitude
7110
7154a
71546
7156
7154c
7154n
1/Ts
2/Ts
3/Ts
n/Ts
Frequency

FIG. 71C

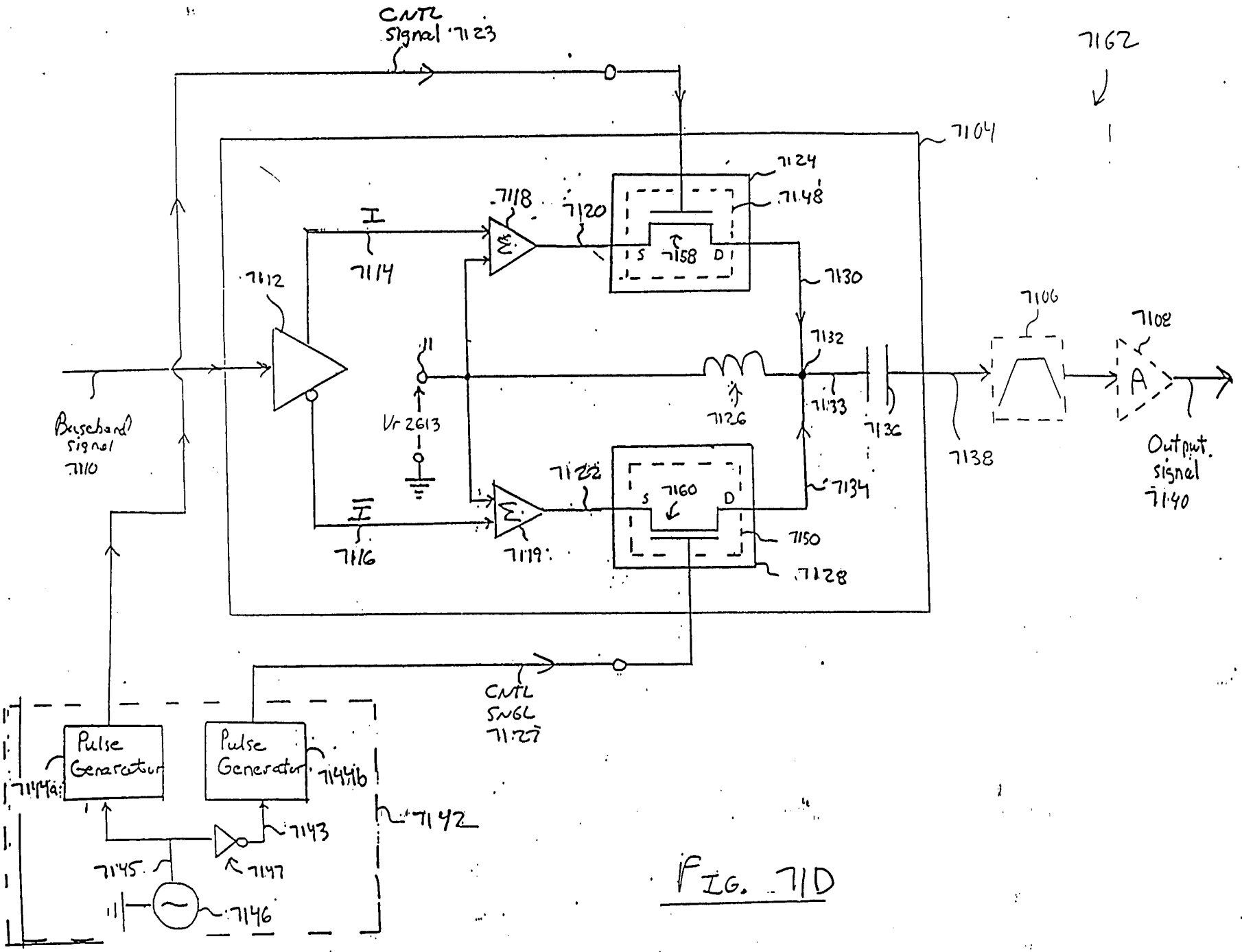

CNTL signal 7123
7162
7104
7124
7148
7118
7120
I
7114
7158
S
D
7130
7112
7106
7108
7132
Vr 2613
7126
7133
7136
7138
Buschard signal 7110
7122
7160
7134
7150
7128
7116
7119
Output signal 7140
CNTL SNGL 7127
Pulse Generator
7144a
Pulse Generator
7144b
7142
7143
7145
7147
7146

FIG. 7D

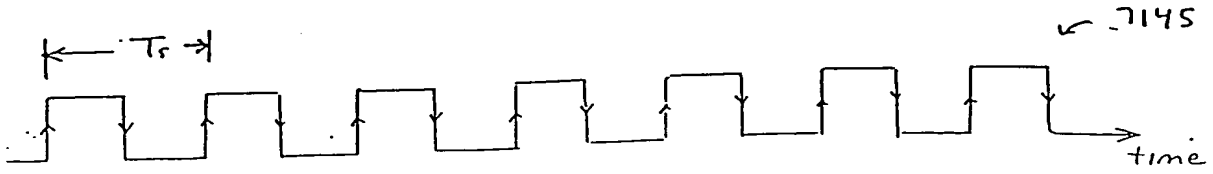


FIG. 72A

FIG. 72B

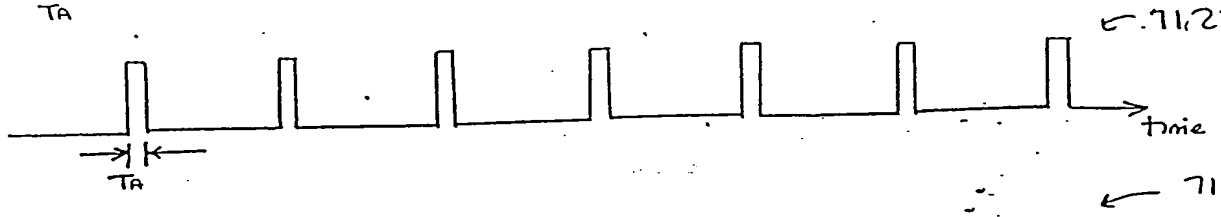


FIG. 72C

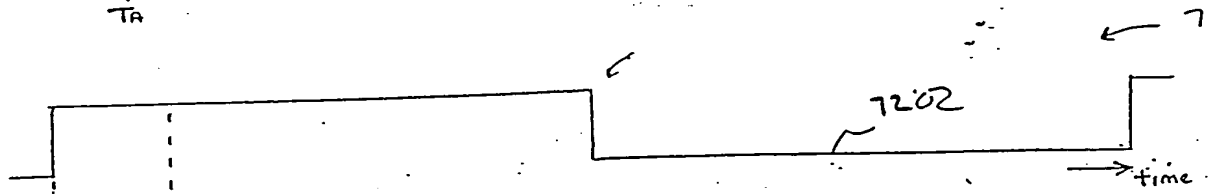


FIG. 72D

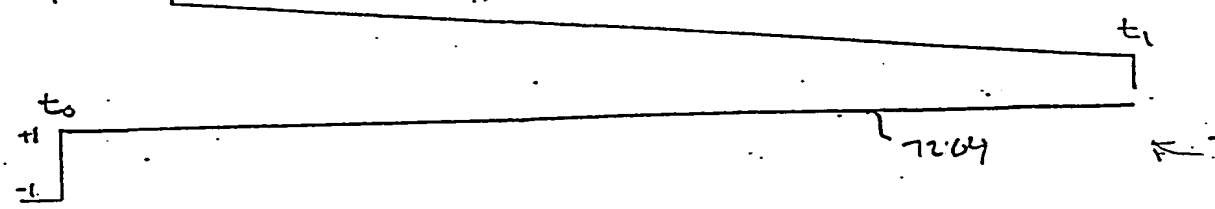


FIG. 72E

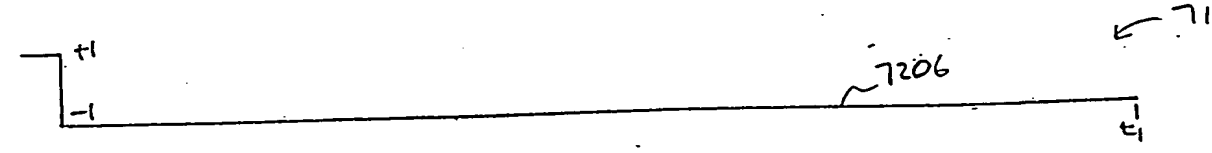


FIG. 72F

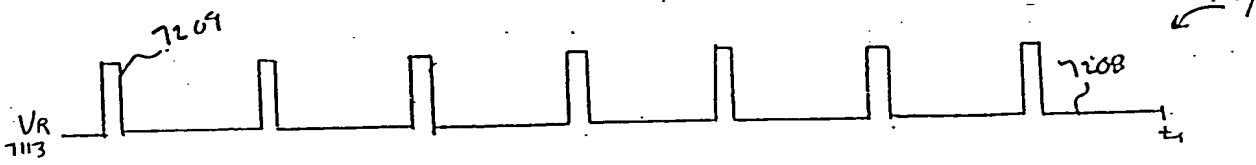


FIG. 72G

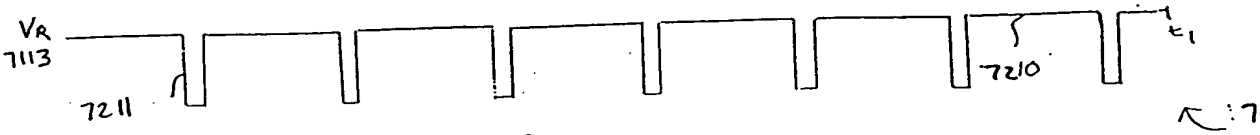


FIG. 72H

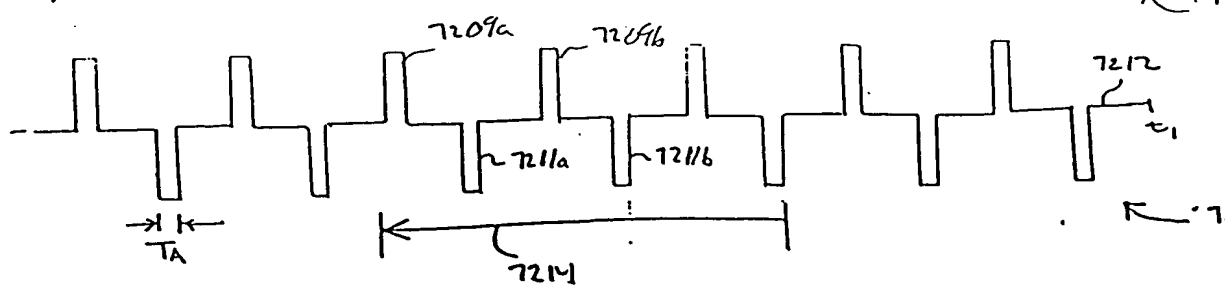


FIG. 72I

Aperture = 500ps
Fundamental Clock = 200Mhz (5th Subharmonic)

Square Wave Frequency = 200Mhz

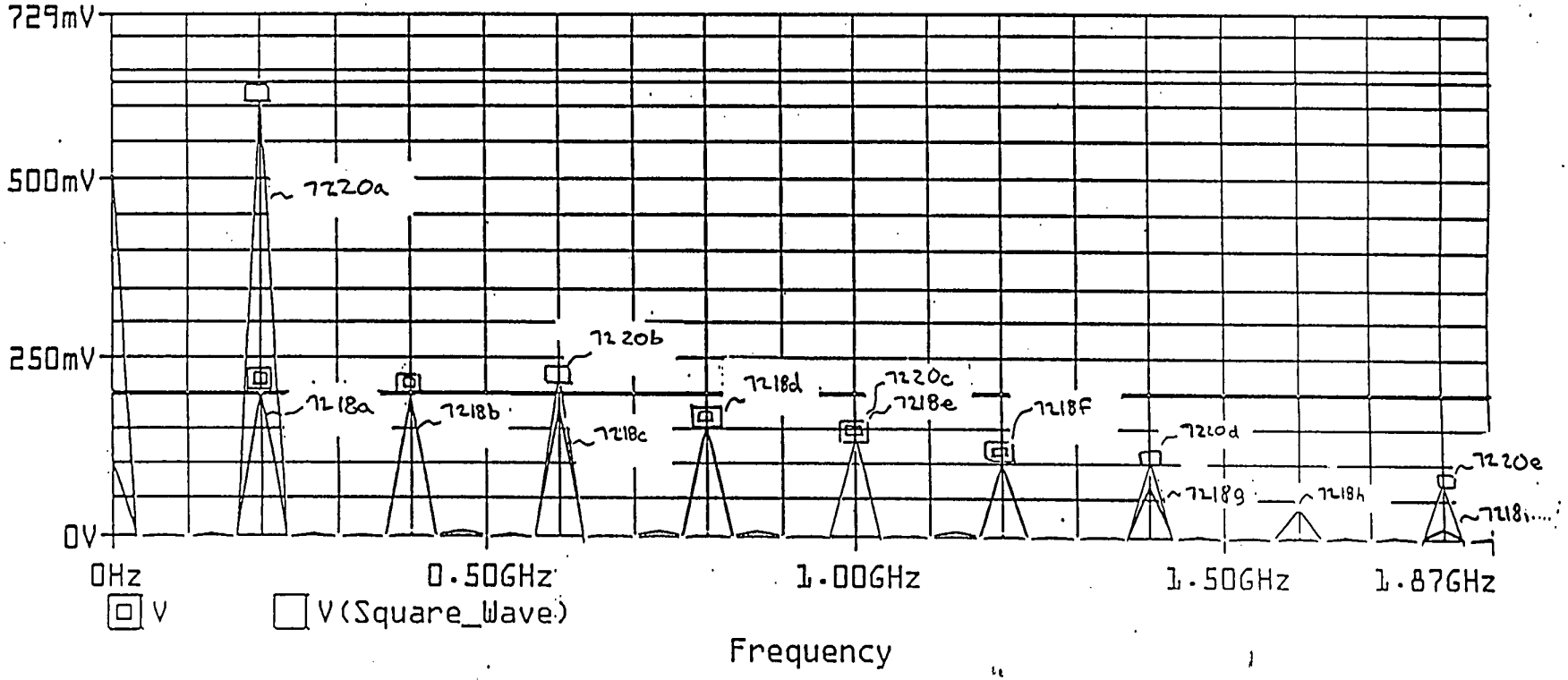


FIG. 72J

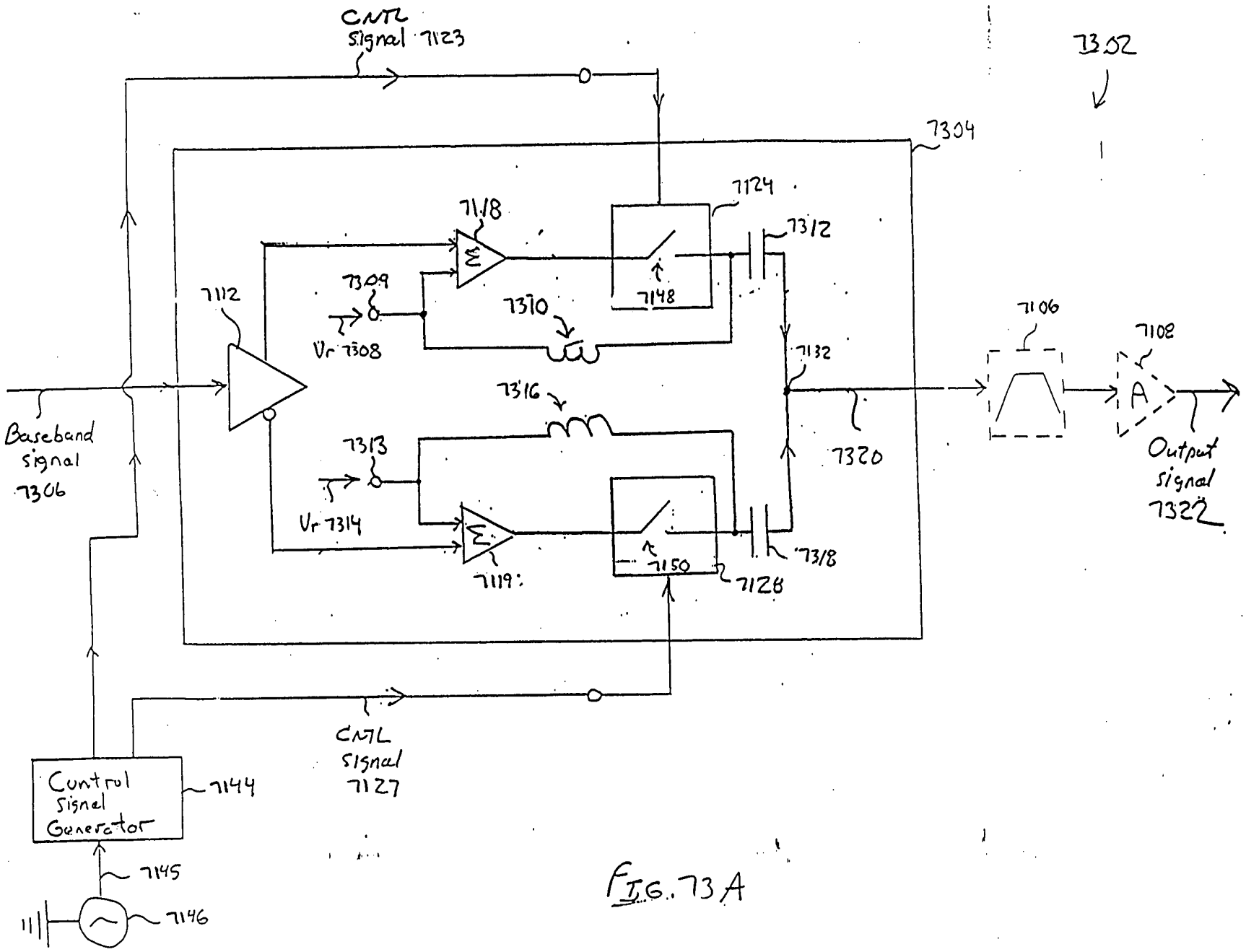

CNTL signal 7123
7302
7304
7124
7118
7312
7309
7112
7310
7148
Vr 7308
7106
7108
7132
7316
Baseband signal 7306
7313
7320
Output signal 7322
Vr 7314
7119
7150
7318
7128
CNTL signal 7127
Control Signal Generator
7144
7145
7146

FIG. 73A

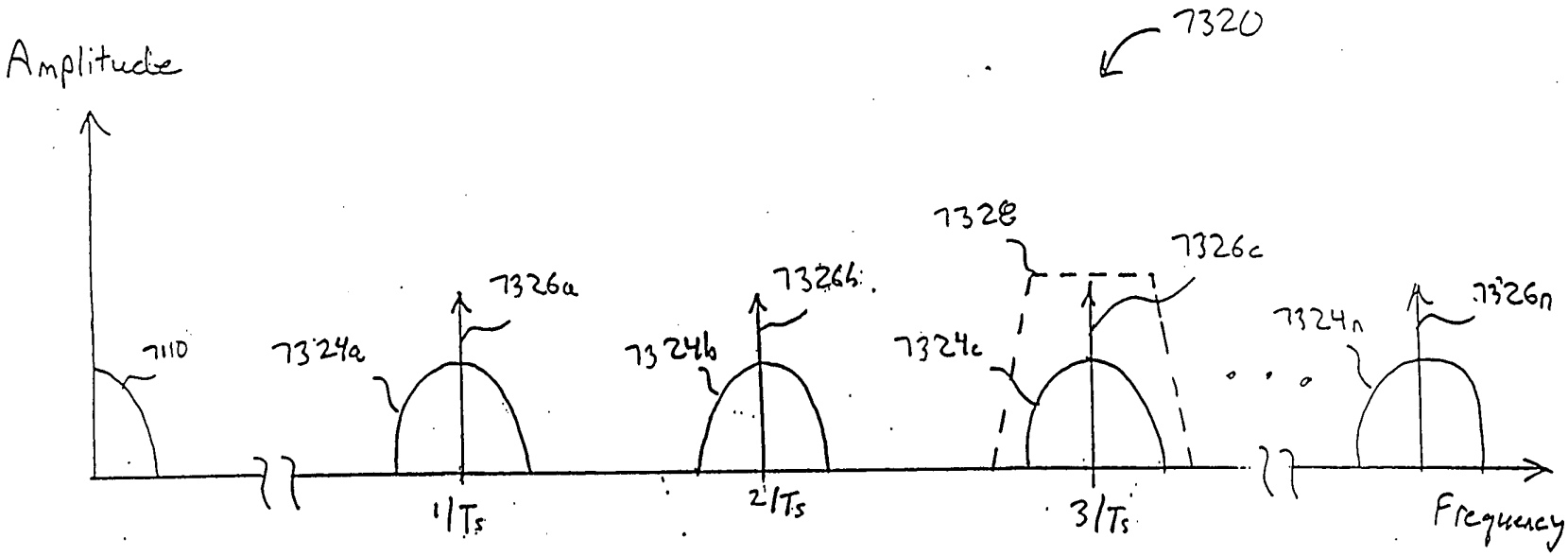

7320
Amplitude
7110
7324a
7326a
7324b
7326b
7328
7326c
7324c
7324n
7326n
1/Ts
2/Ts
3/Ts
Frequency

FIG. 73B

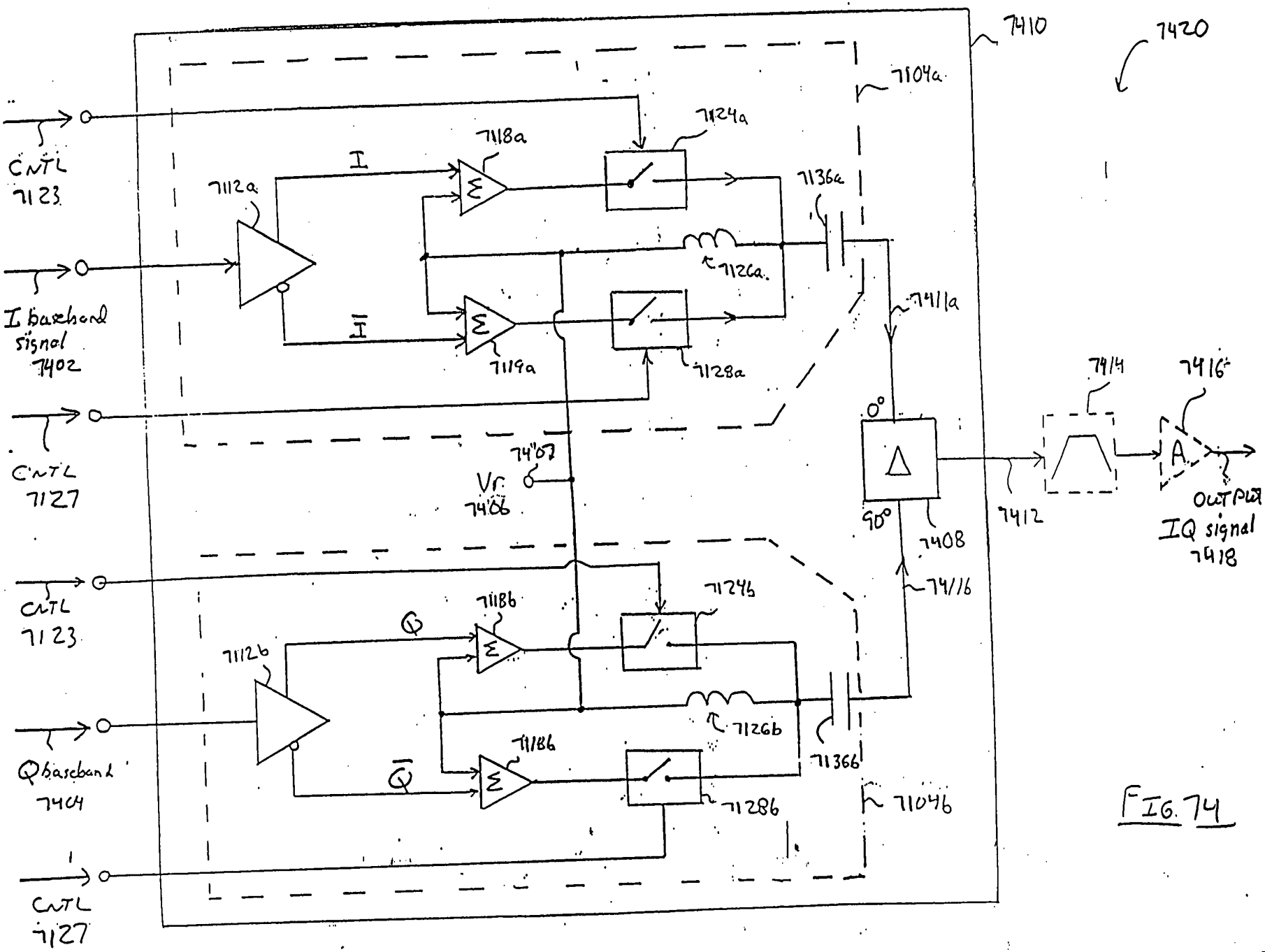

7410
7420
7104a
CNTL 7123
I baseband signal 7402
CNTL 7127
7112a
7118a
7124a
7136a
7126a
7119a
7128a
7111a
I
Ī
Vr 7406
7407
0°
90°
7408
7412
7414
7416
OUTPUT IQ signal 7418
7116
CNTL 7123
Q baseband 7404
CNTL 7127
7112b
7118b
7124b
7126b
7136b
7128b
7104b
Q
Q̄

FIG. 74

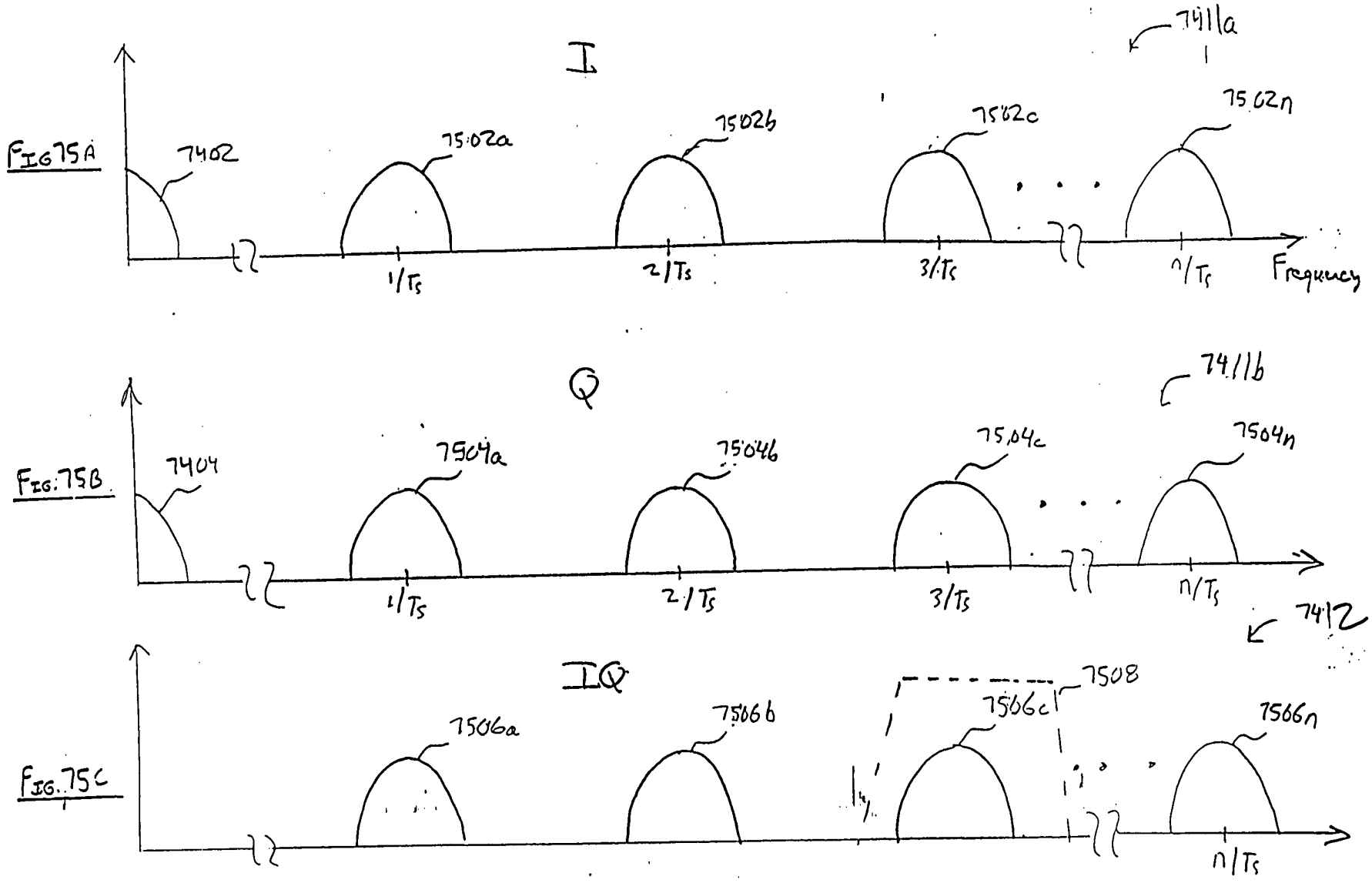


FIG 75A

FIG. 75B

FIG. 75C

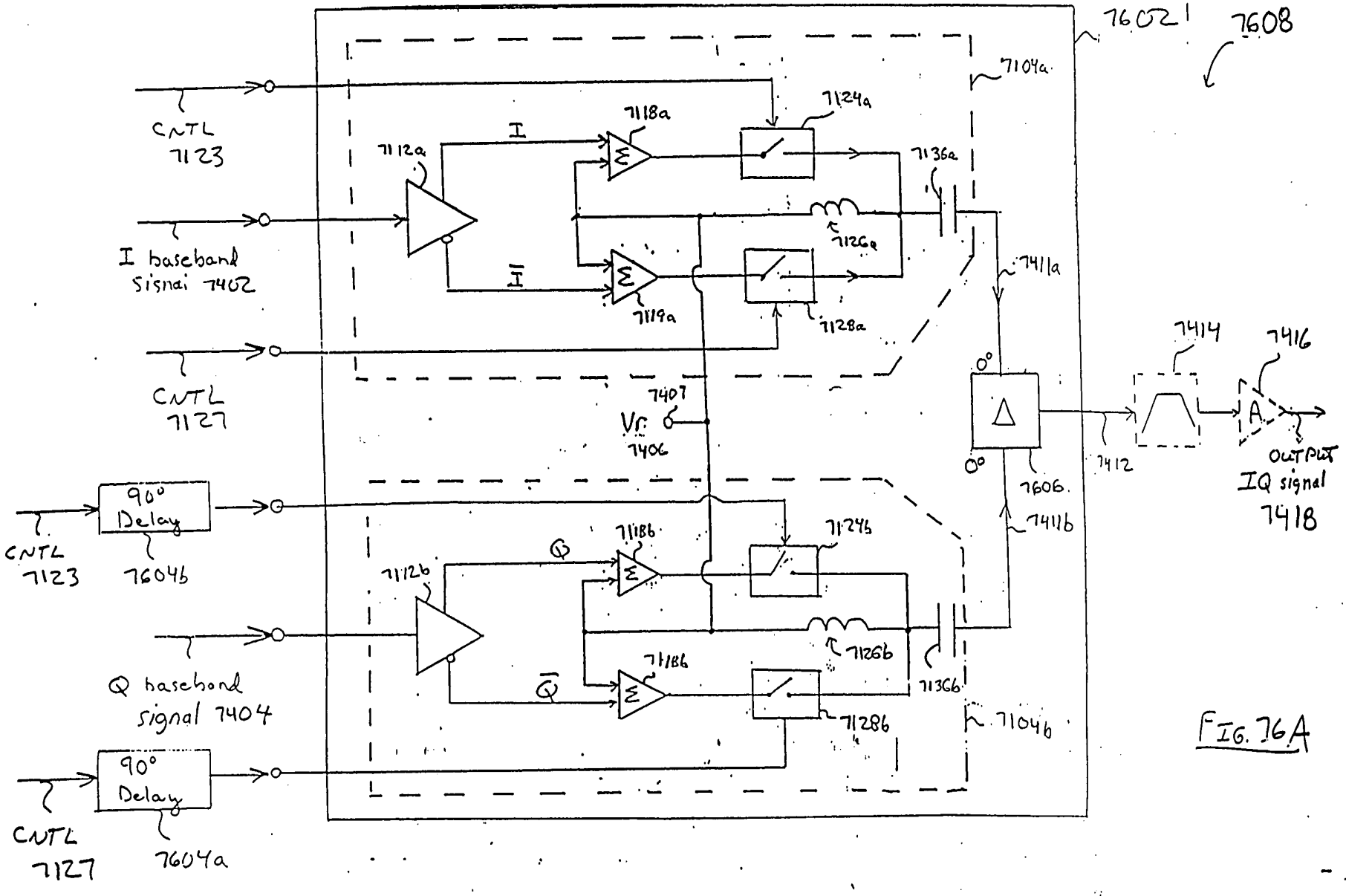

7602
7608
7104a
CNTL 7123
I baseband signal 7402
CNTL 7127
7112a
I
$\bar{I}$
7118a
7119a
7124a
7128a
7126a
7136a
7111a
7407
Vr 7406
90° Delay
7604b
CNTL 7123
Q baseband signal 7404
90° Delay
7604a
CNTL 7127
7112b
Q
$\bar{Q}$
7118b
7119b
7124b
7128b
7126b
7136b
7111b
7104b
0°
0°
7606
7412
7414
7416
OUTPUT IQ signal 7418

FIG. 76A

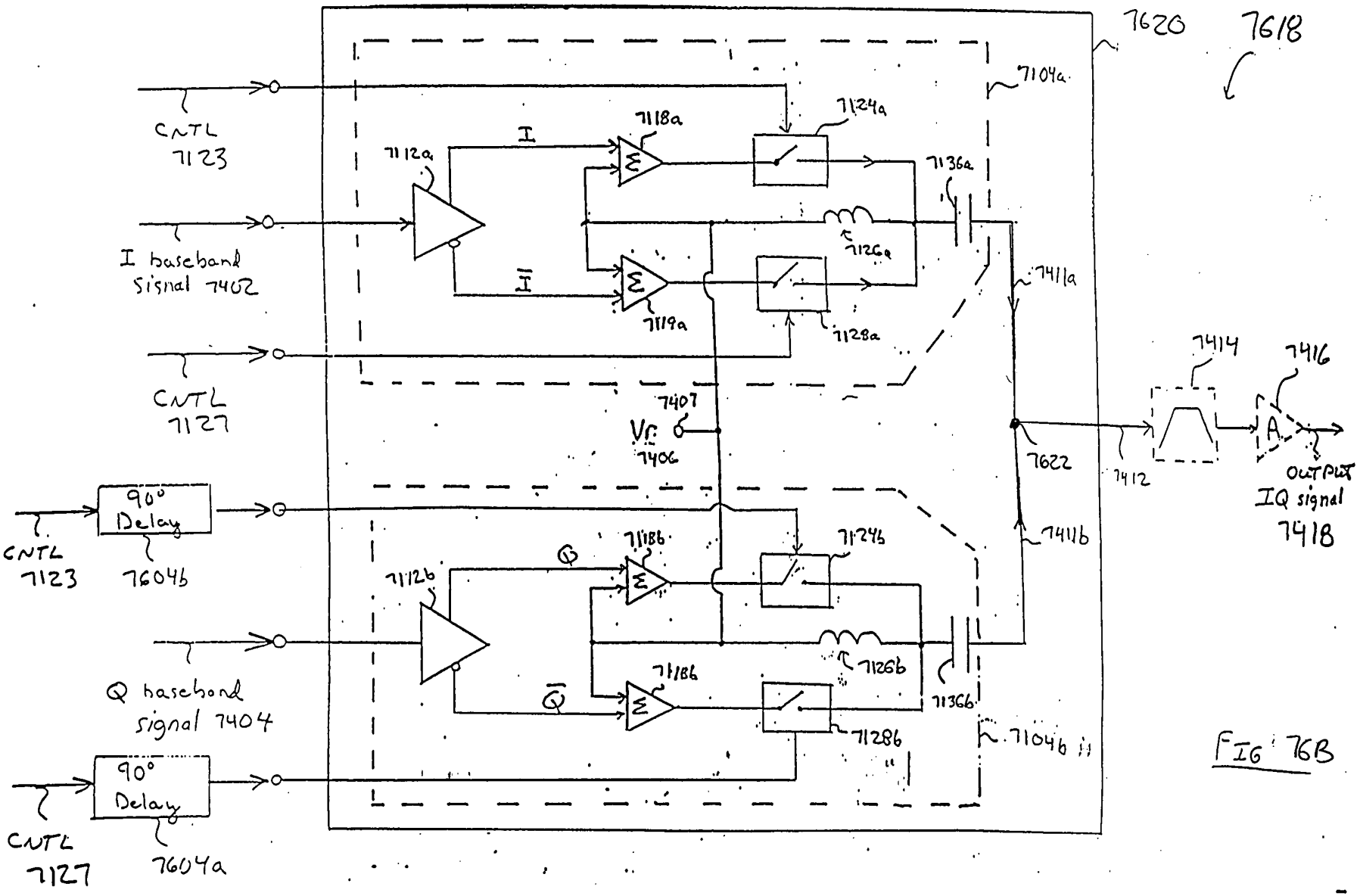

7620
7618
7104a
CNTL 7123
I baseband signal 7402
CNTL 7127
7112a
7118a
7124a
7136a
7126a
7119a
7128a
7411a
7407
Vc 7406
7414
7416
7622
7412
OUTPUT IQ signal 7418
90° Delay
7604b
CNTL 7123
Q baseband signal 7404
90° Delay
7604a
CNTL 7127
7112b
7118b
7124b
7126b
7136b
7128b
7411b
7104b

FIG 7B

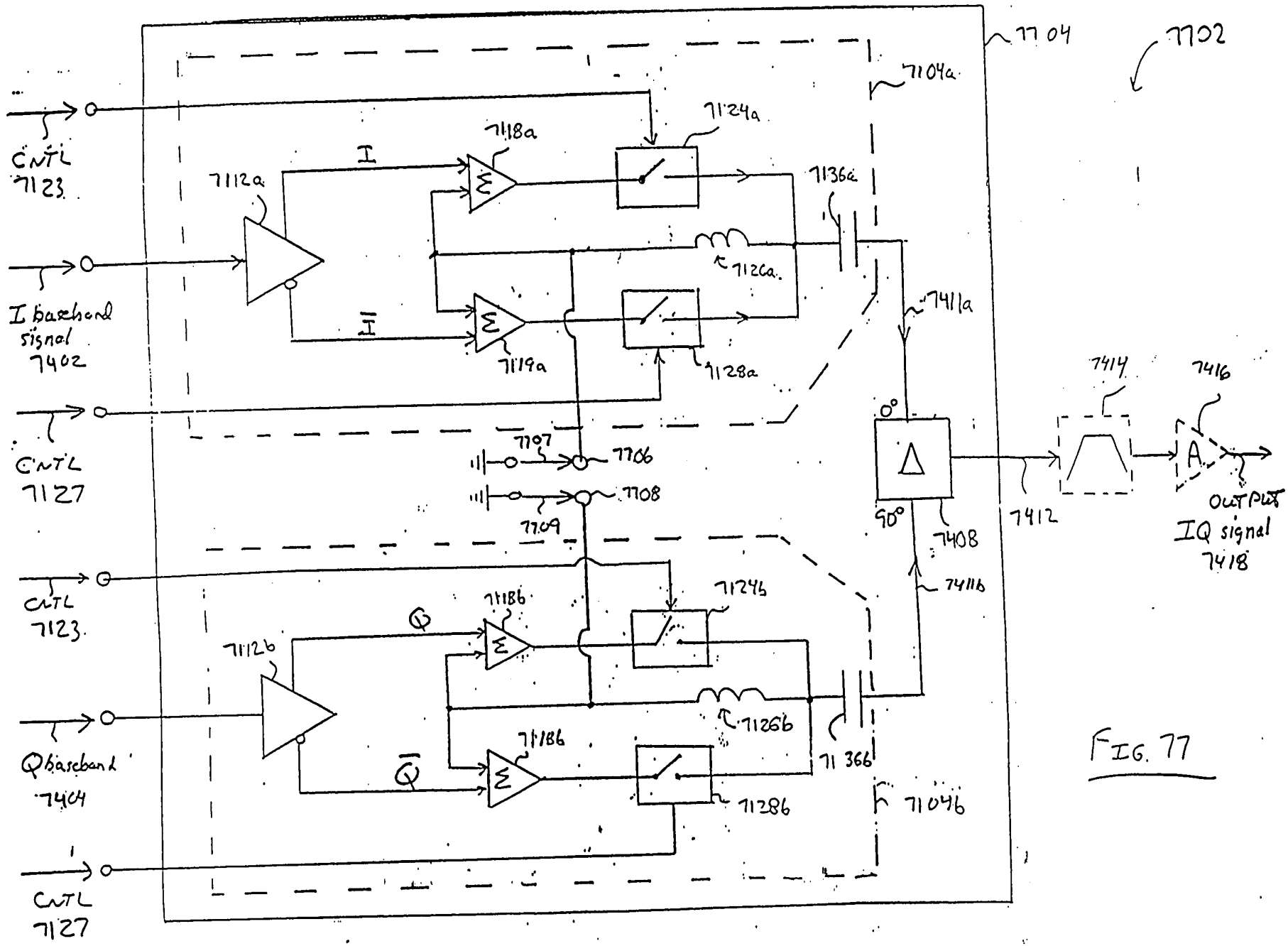

7704
7702
7104a
7124a
7118a
CNTL 7123
7112a
I
7136a
I baseband signal 7402
7126a
7411a
7119a
7128a
7414
7416
CNTL 7127
7107
7106
7108
7109
0°
90°
7408
7412
OUTPUT IQ signal 7418
CNTL 7123
7124b
7118b
Q
7112b
7126b
Q baseband 7404
7118b
71366
$\overline{Q}$
7128b
7104b
CNTL 7127

FIG. 77

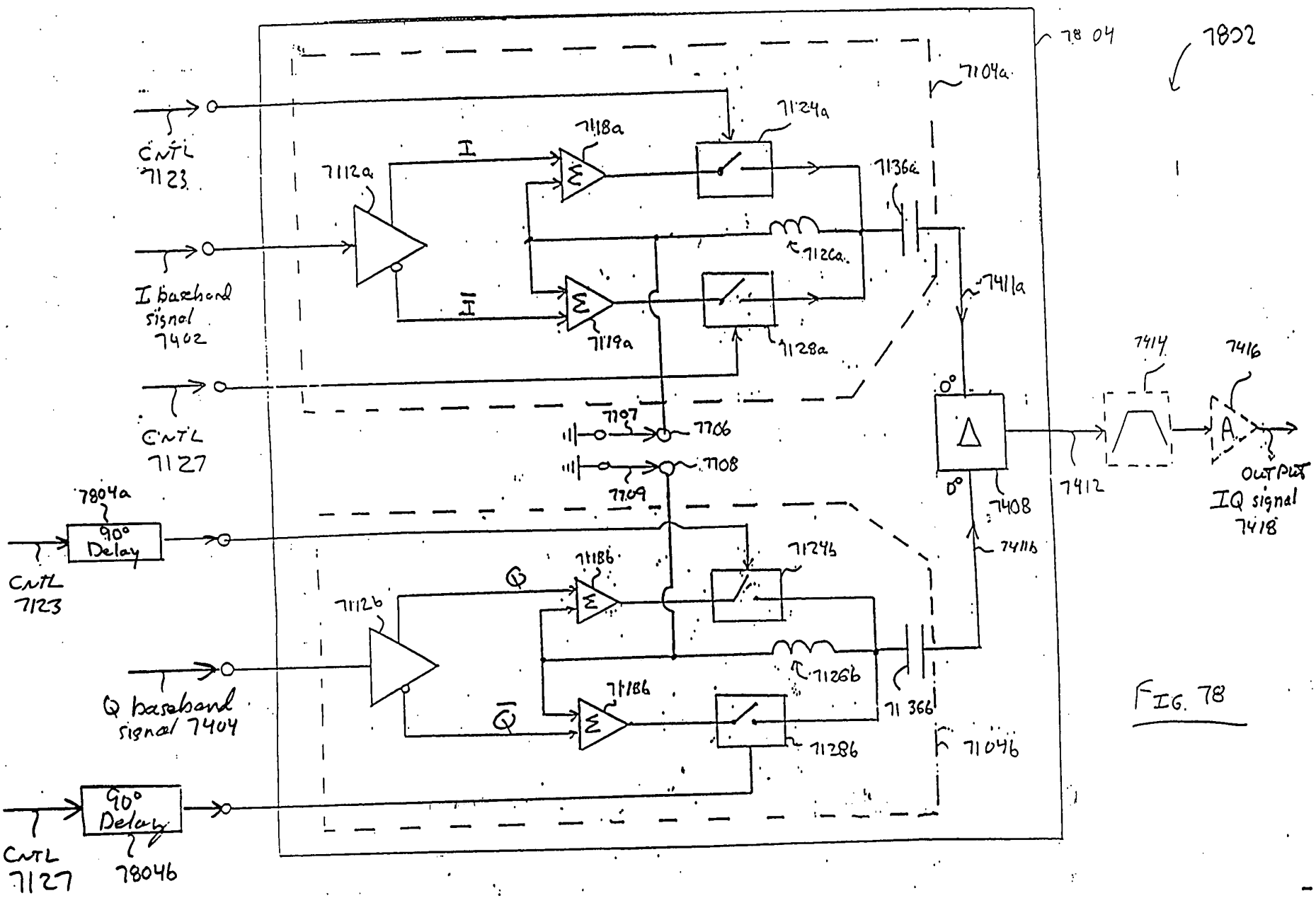

7804
7802
7104a
7124a
7118a
7112a
I
CNTL 7123
7136a
I baseband signal 7402
7122a
7111a
7119a
7128a
7414
7416
CNTL 7127
7107
7106
7108
7109
7804a
90° Delay
7408
7412
output IQ signal 7418
7111b
7124b
7118b
7112b
Q
Q baseband signal 7404
7122b
7136b
7118b
7128b
7104b
CNTL 7123
90° Delay
CNTL 7127
7804b

FIG. 78

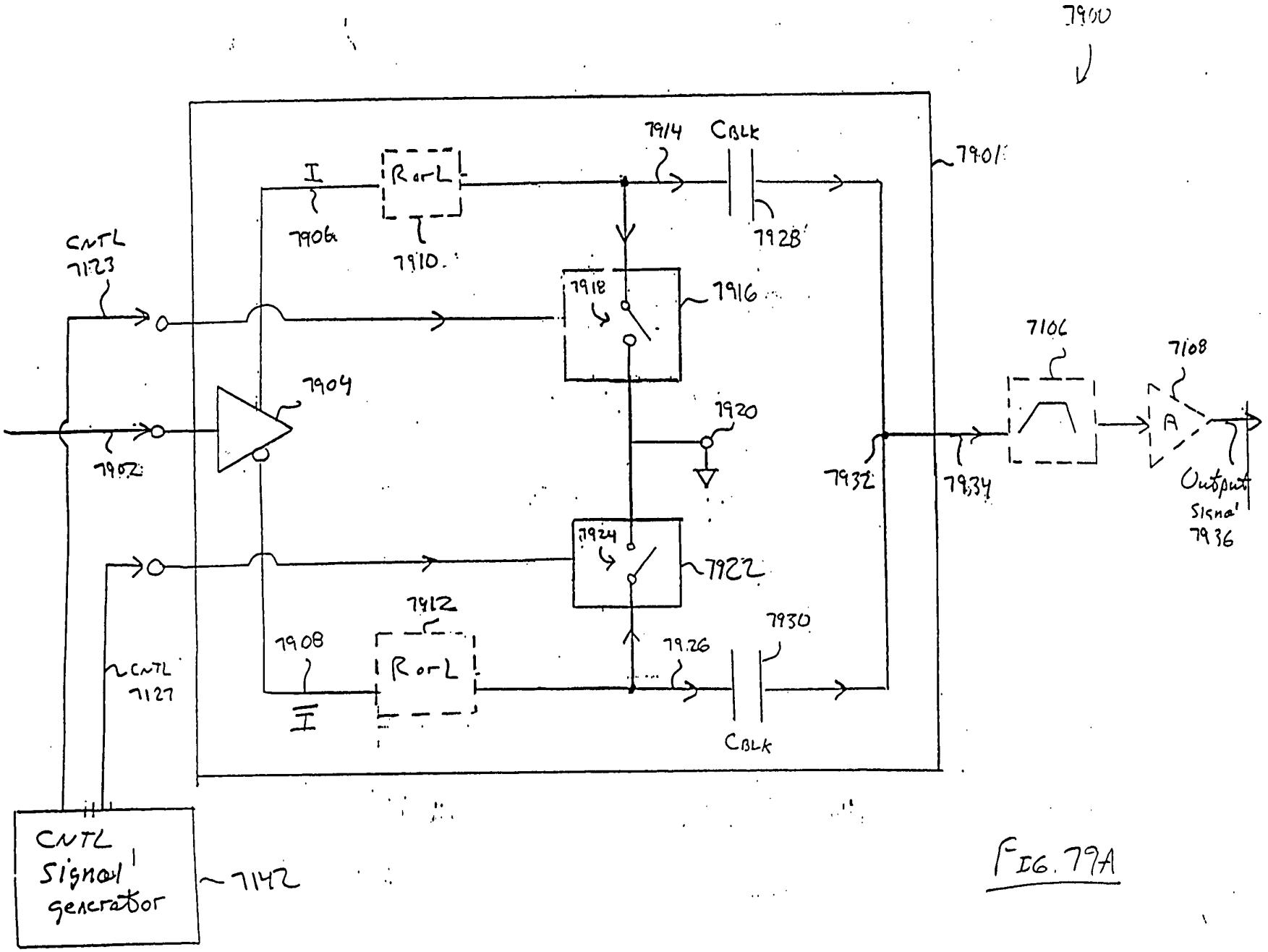

7900
7901
7914
CBLK
I
R or L
7906
7910
7928
CNTL
7123
7916
7918
7904
7920
7902
7106
7108
7932
7934
A
Output
Signal
7936
7924
7922
7912
7908
7930
7926
CNTL
7127
I
CBLK
CNTL
Signal
generator
7142

FIG. 79A

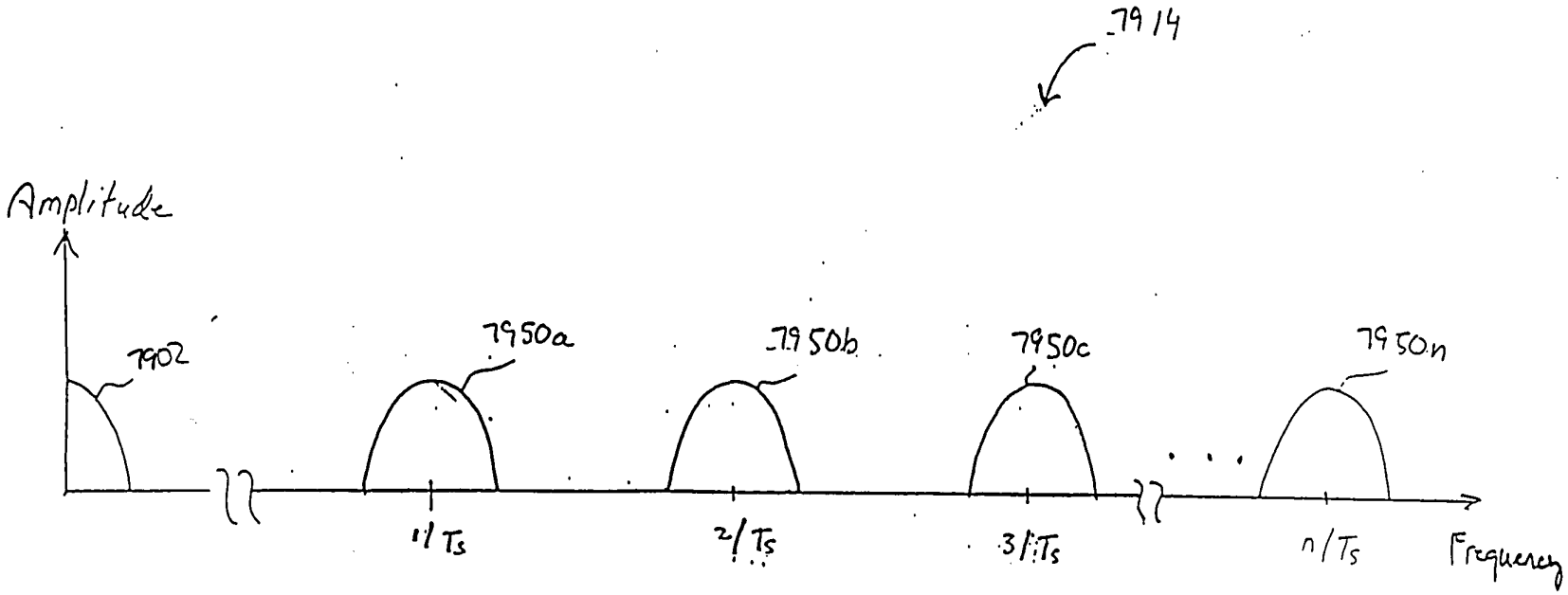

7914
Amplitude
7902
7950a
7950b
7950c
7950n
1/Ts
2/Ts
3/Ts
n/Ts
Frequency

FIG. 79B

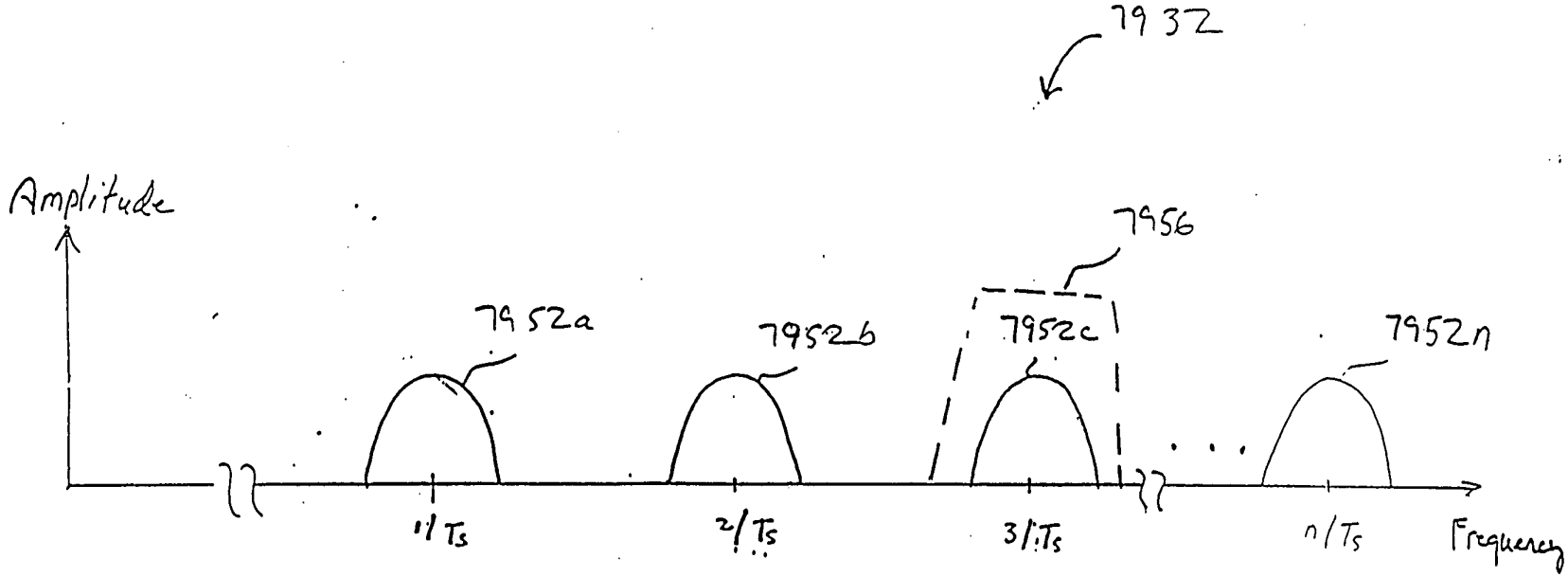

7932
Amplitude
7956
7952a
7952b
7952c
7952n
1/Ts
2/Ts
3/Ts
n/Ts
Frequency

FIG. 79c

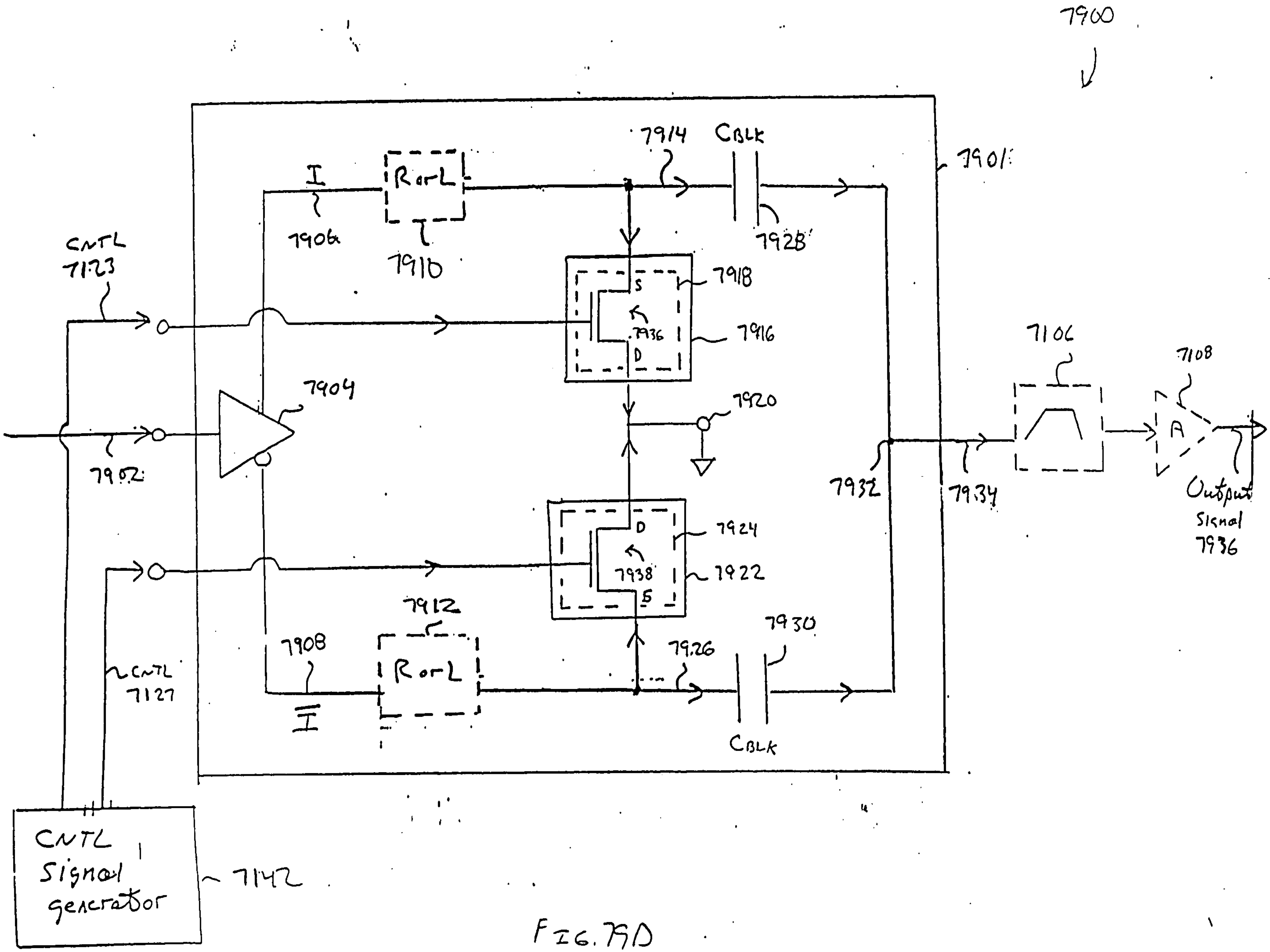


FIG. 79D

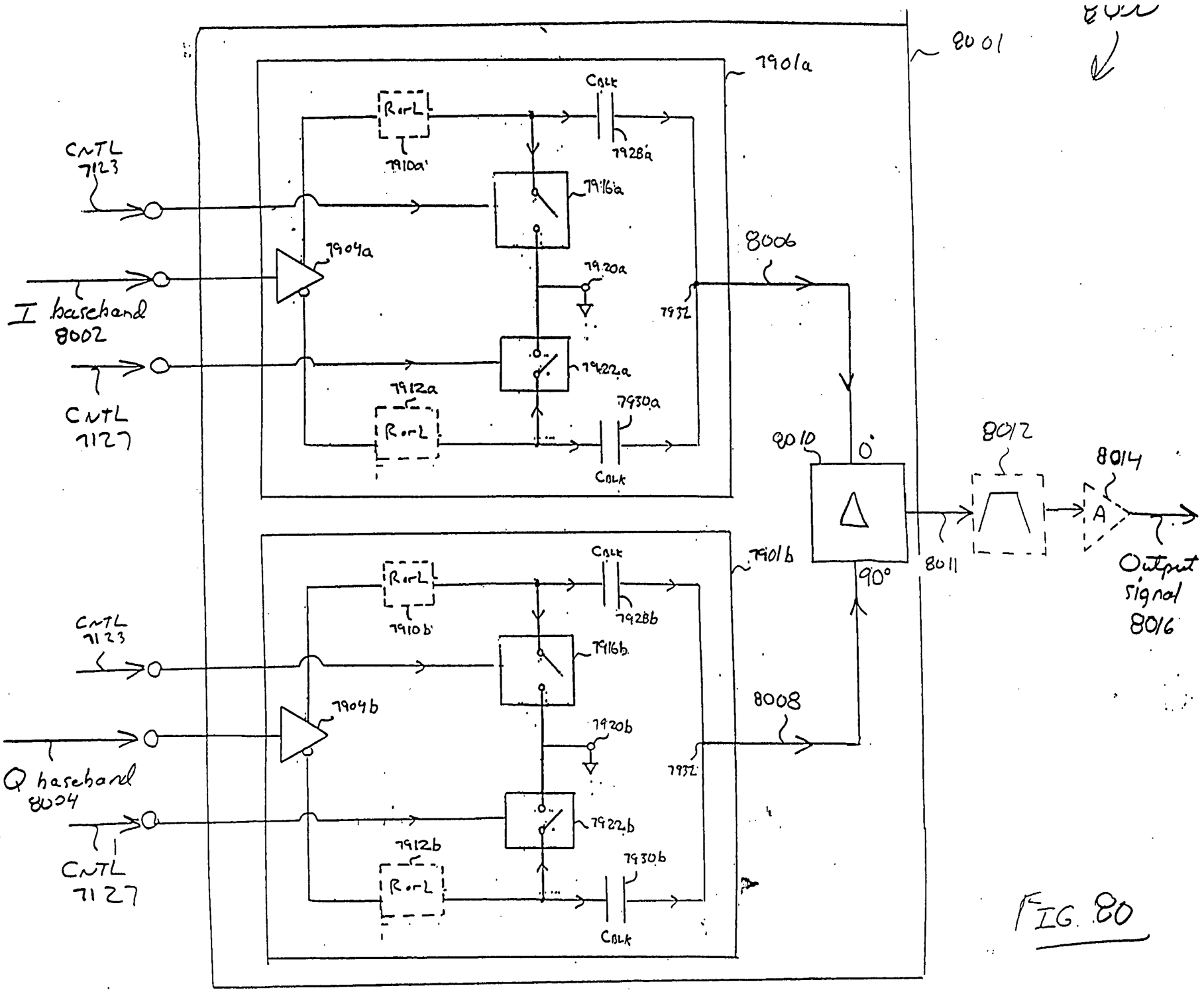

8001
7901a
R or L
7910a'
C BLK
7928a
CNTL 7123
7916a
7904a
I baseband 8002
7920a
8006
7932
CNTL 7127
7922a
7912a
7930a
8010
0°
8012
8014
A
Output signal 8016
7901b
7928b
7916b
7904b
Q baseband 8004
7920b
8008
7922b
7912b
7930b
90°
8011

FIG. 80

FIG. 81A

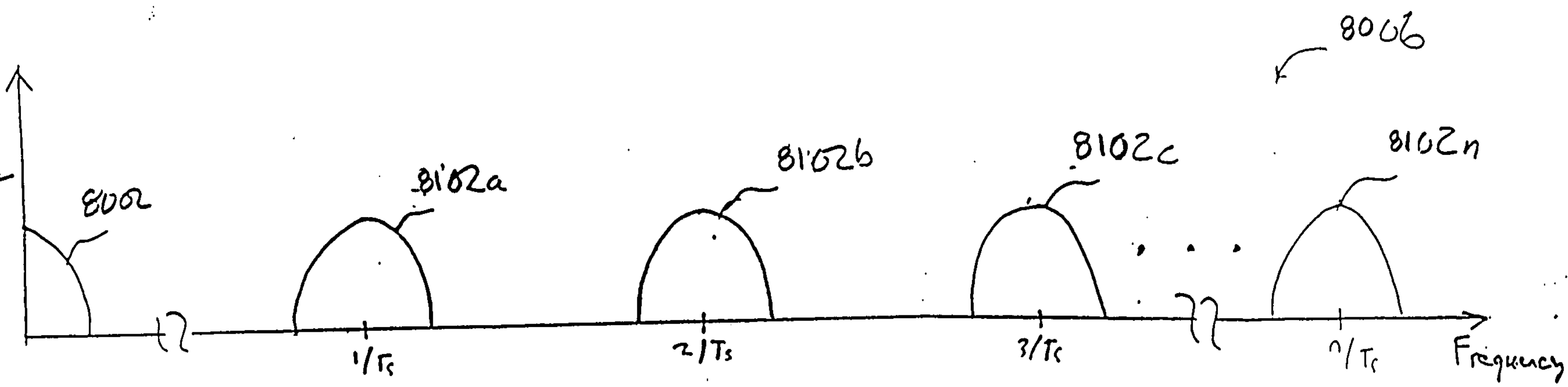


FIG. 81B

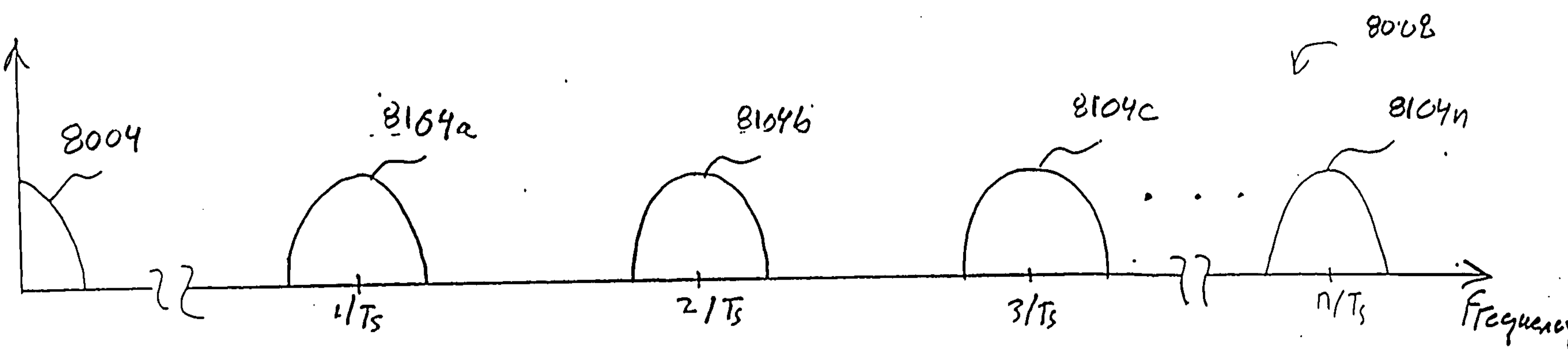
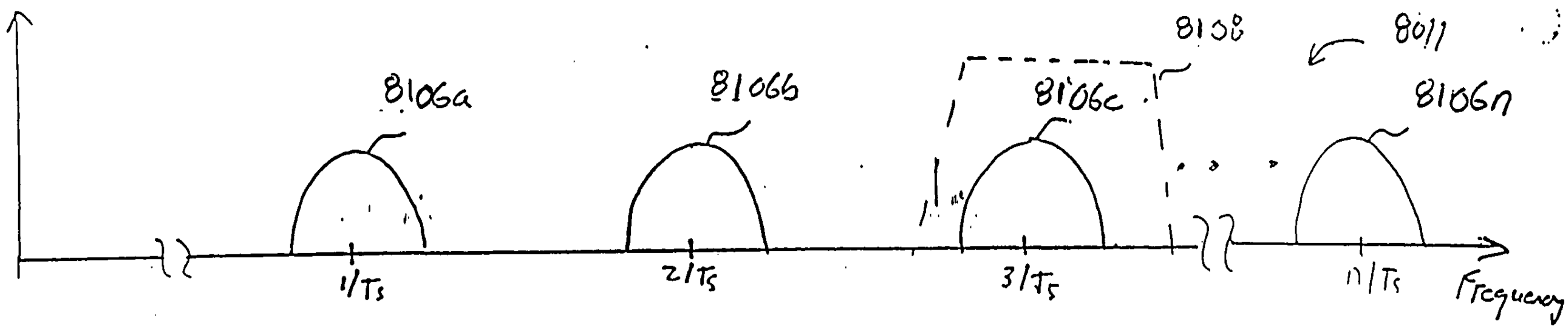


FIG. 81C



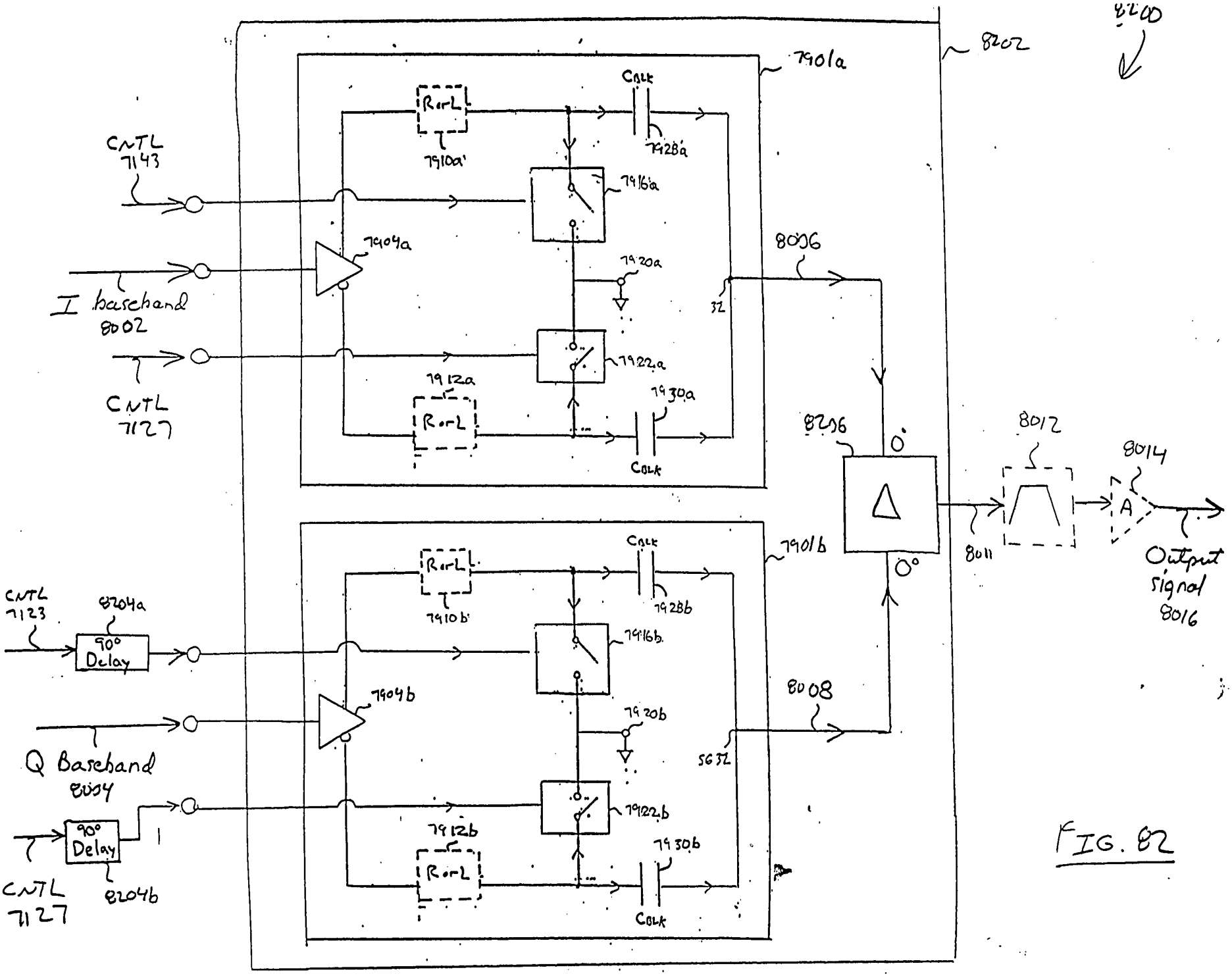

8200
8202
7901a
7901b
CNTL 7143
I baseband 8002
CNTL 7127
Q Baseband 8004
CNTL 7123
8204a
90° Delay
8204b
90° Delay
CNTL 7127
7904a
7904b
7910a'
7910b'
7912a
7912b
7916a
7916b
7920a
7920b
7922a
7922b
7928a
7928b
7930a
7930b
R or L
Clk
8006
8008
8056
8058
8011
8012
8014
A
Output signal 8016

FIG. 82

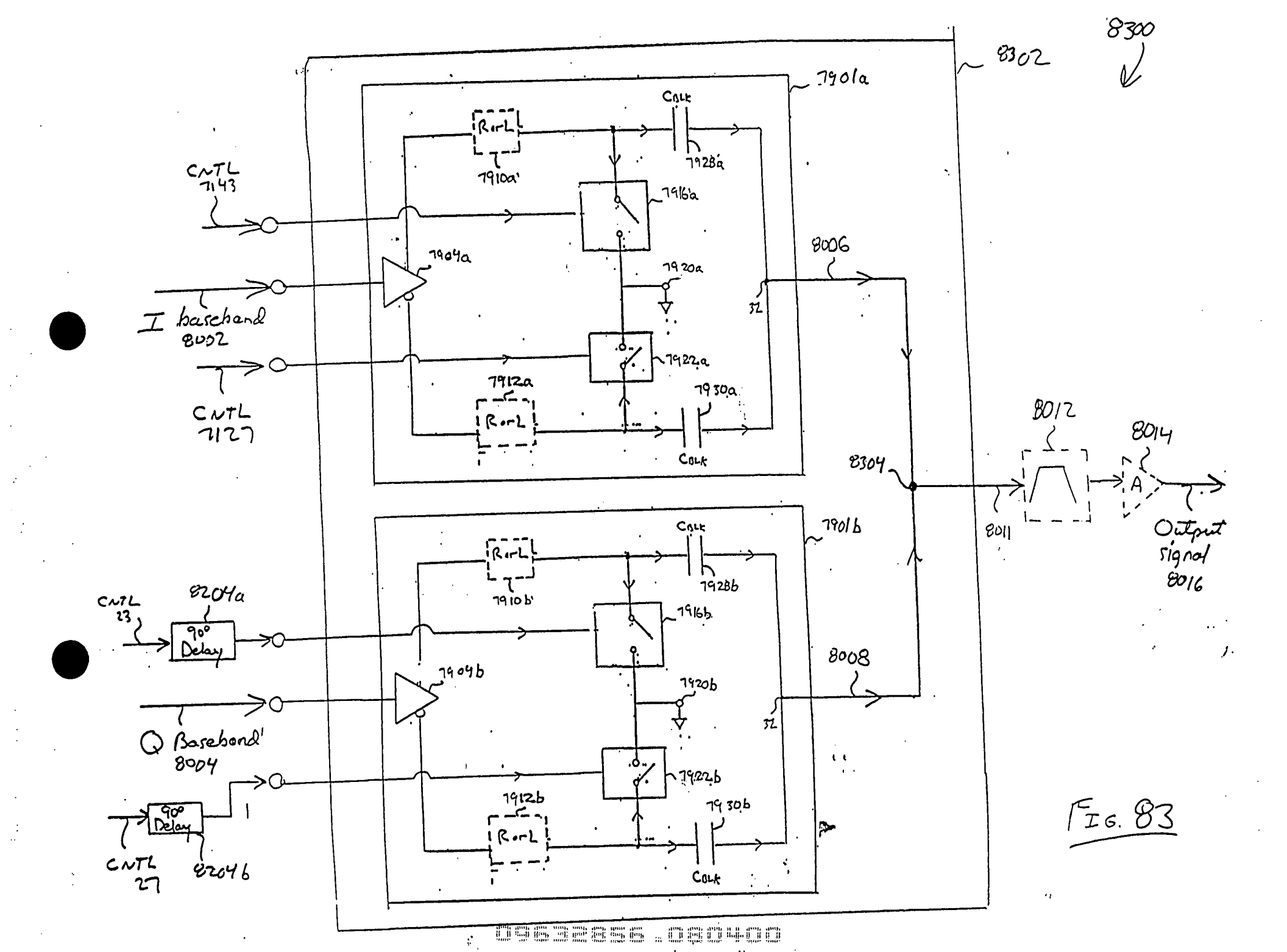

8300
8302
7901a
7901b
CNTL 7143
I baseband 8002
CNTL 7127
CNTL 23
8204a
90° Delay
Q Baseband' 8004
90° Delay
CNTL 27
8204b
R or L
7910a'
7910b'
7912a
7912b
7916a
7916b
7904a
7904b
7920a
7920b
7922a
7922b
7928a
7928b
7930a
7930b
Cblk
SZ
8006
8008
8304
8011
8012
8014
A
Output signal 8016

FIG. 83

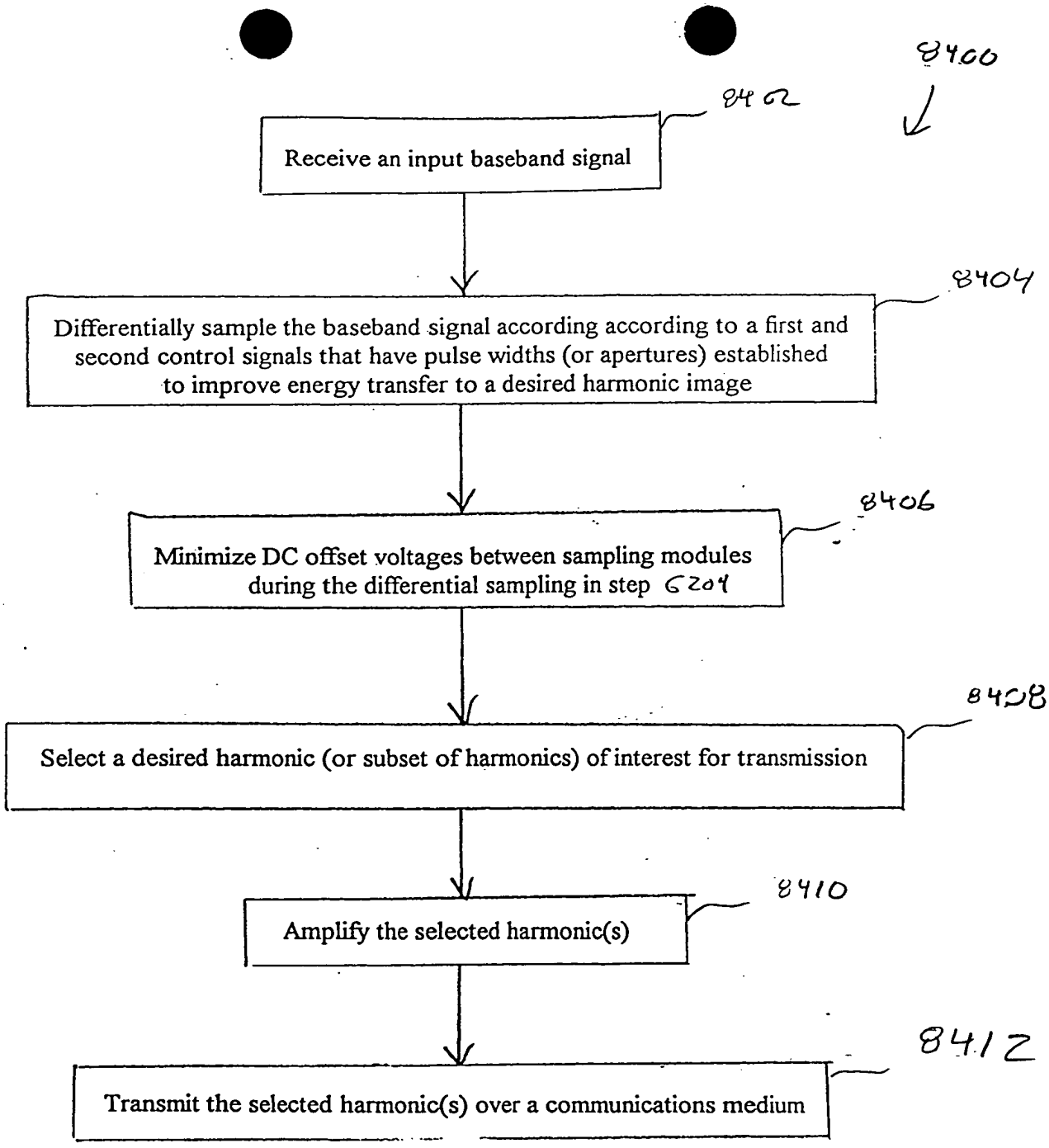

8400
8402
Receive an input baseband signal
8404
Differentially sample the baseband signal according according to a first and second control signals that have pulse widths (or apertures) established to improve energy transfer to a desired harmonic image
8406
Minimize DC offset voltages between sampling modules during the differential sampling in step 6204
8408
Select a desired harmonic (or subset of harmonics) of interest for transmission
8410
Amplify the selected harmonic(s)
8412
Transmit the selected harmonic(s) over a communications medium

FIG. 84

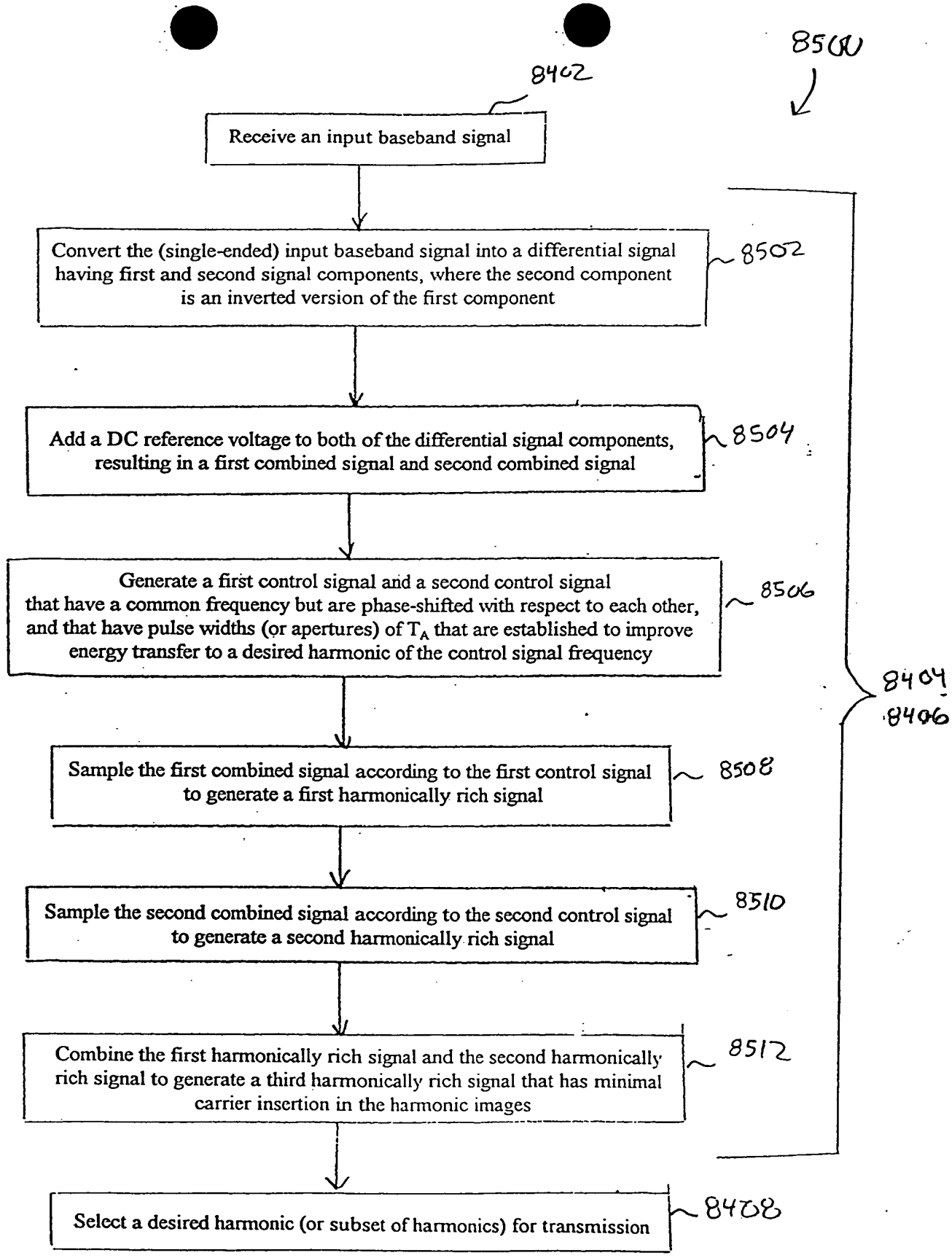

8500
8402
Receive an input baseband signal
Convert the (single-ended) input baseband signal into a differential signal having first and second signal components, where the second component is an inverted version of the first component
8502
Add a DC reference voltage to both of the differential signal components, resulting in a first combined signal and second combined signal
8504
Generate a first control signal and a second control signal that have a common frequency but are phase-shifted with respect to each other, and that have pulse widths (or apertures) of T_A that are established to improve energy transfer to a desired harmonic of the control signal frequency
8506
8404
8406
Sample the first combined signal according to the first control signal to generate a first harmonically rich signal
8508
Sample the second combined signal according to the second control signal to generate a second harmonically rich signal
8510
Combine the first harmonically rich signal and the second harmonically rich signal to generate a third harmonically rich signal that has minimal carrier insertion in the harmonic images
8512
Select a desired harmonic (or subset of harmonics) for transmission
8408

FIG. 85

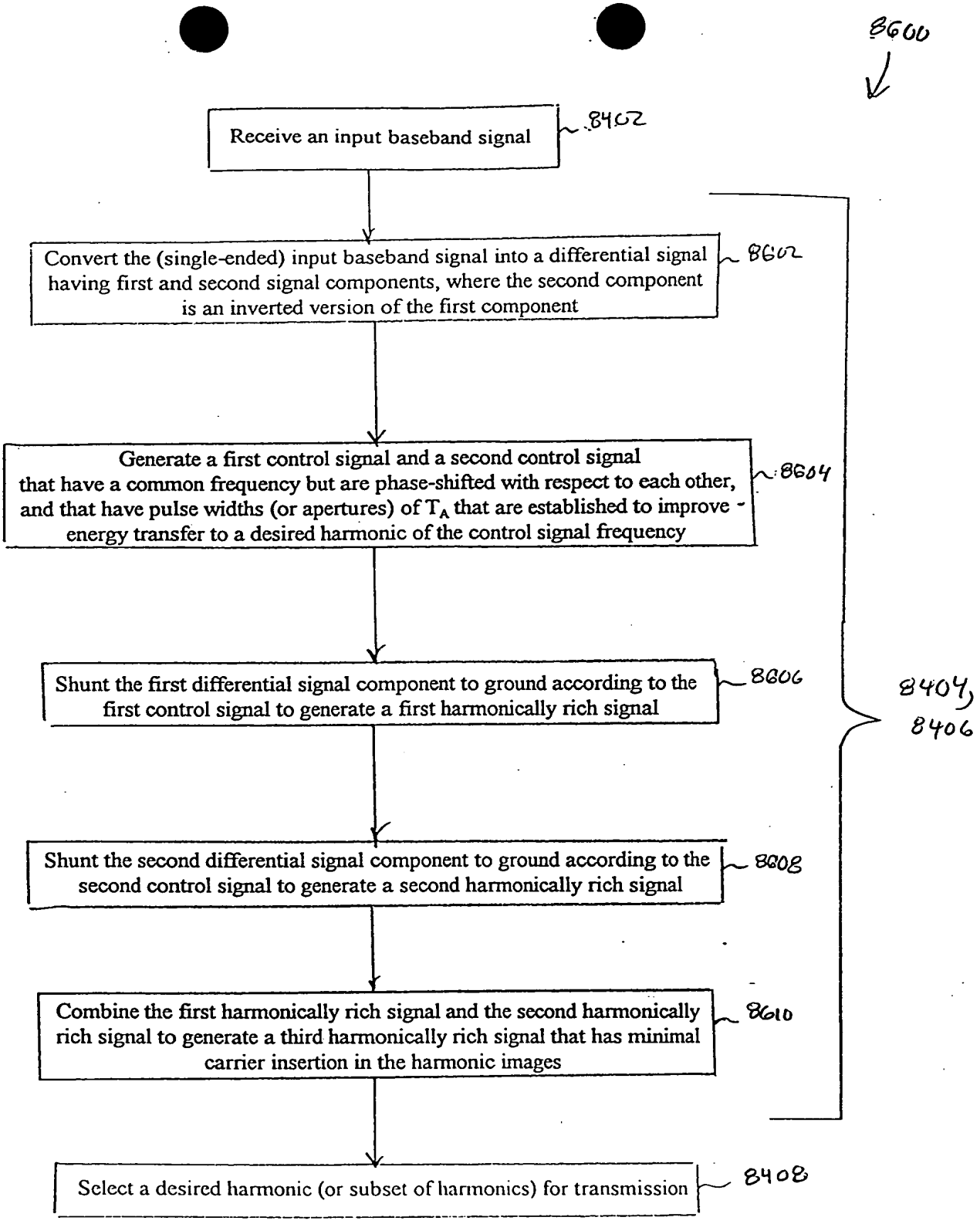

8600
Receive an input baseband signal
8402
Convert the (single-ended) input baseband signal into a differential signal having first and second signal components, where the second component is an inverted version of the first component
8602
Generate a first control signal and a second control signal that have a common frequency but are phase-shifted with respect to each other, and that have pulse widths (or apertures) of T_A that are established to improve energy transfer to a desired harmonic of the control signal frequency
8604
Shunt the first differential signal component to ground according to the first control signal to generate a first harmonically rich signal
8606
Shunt the second differential signal component to ground according to the second control signal to generate a second harmonically rich signal
8608
Combine the first harmonically rich signal and the second harmonically rich signal to generate a third harmonically rich signal that has minimal carrier insertion in the harmonic images
8610
8404
8406
Select a desired harmonic (or subset of harmonics) for transmission
8408

FIG. 86

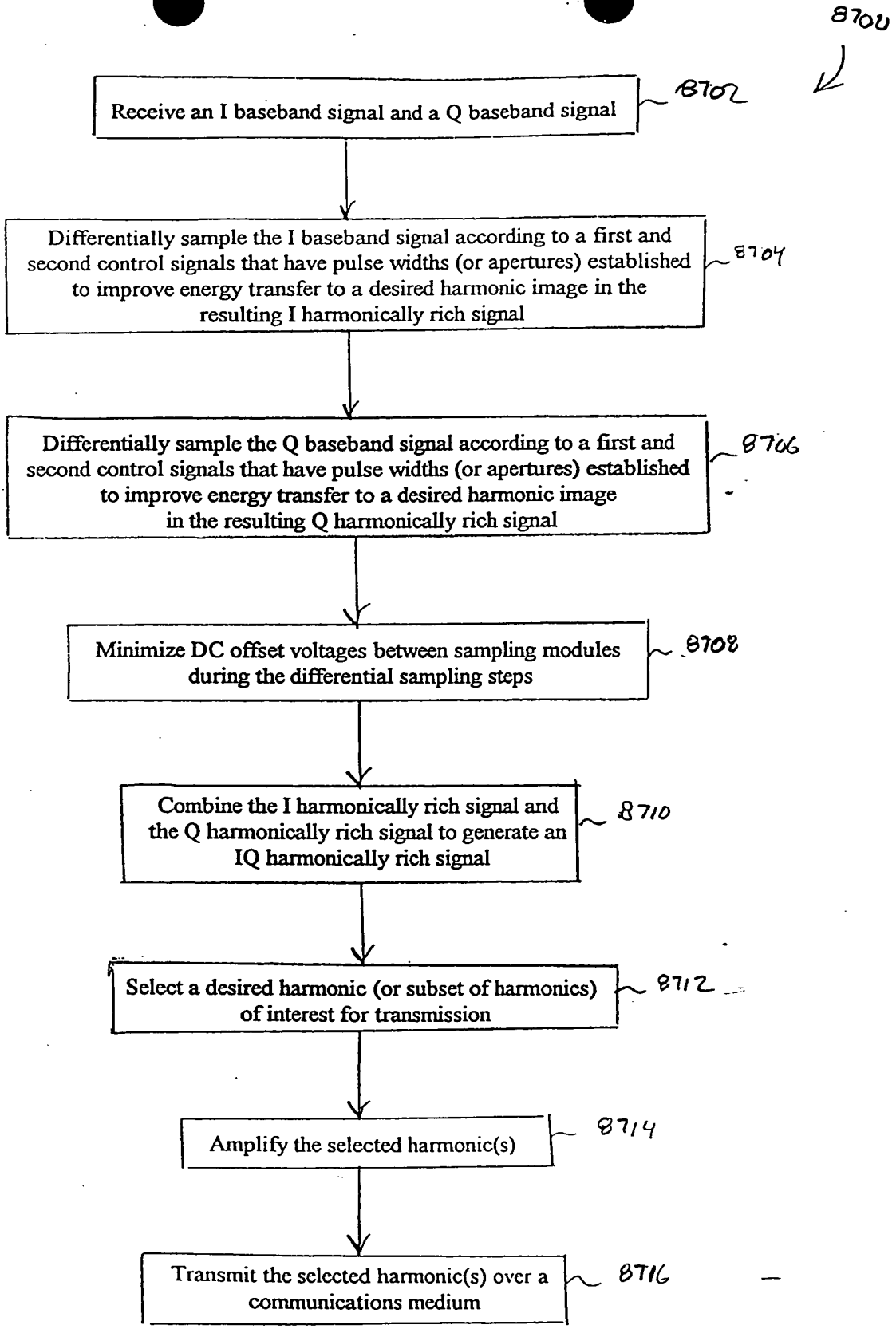

8700
Receive an I baseband signal and a Q baseband signal
8702
Differentially sample the I baseband signal according to a first and second control signals that have pulse widths (or apertures) established to improve energy transfer to a desired harmonic image in the resulting I harmonically rich signal
8704
Differentially sample the Q baseband signal according to a first and second control signals that have pulse widths (or apertures) established to improve energy transfer to a desired harmonic image in the resulting Q harmonically rich signal
8706
Minimize DC offset voltages between sampling modules during the differential sampling steps
8708
Combine the I harmonically rich signal and the Q harmonically rich signal to generate an IQ harmonically rich signal
8710
Select a desired harmonic (or subset of harmonics) of interest for transmission
8712
Amplify the selected harmonic(s)
8714
Transmit the selected harmonic(s) over a communications medium
8716

FIG. 87

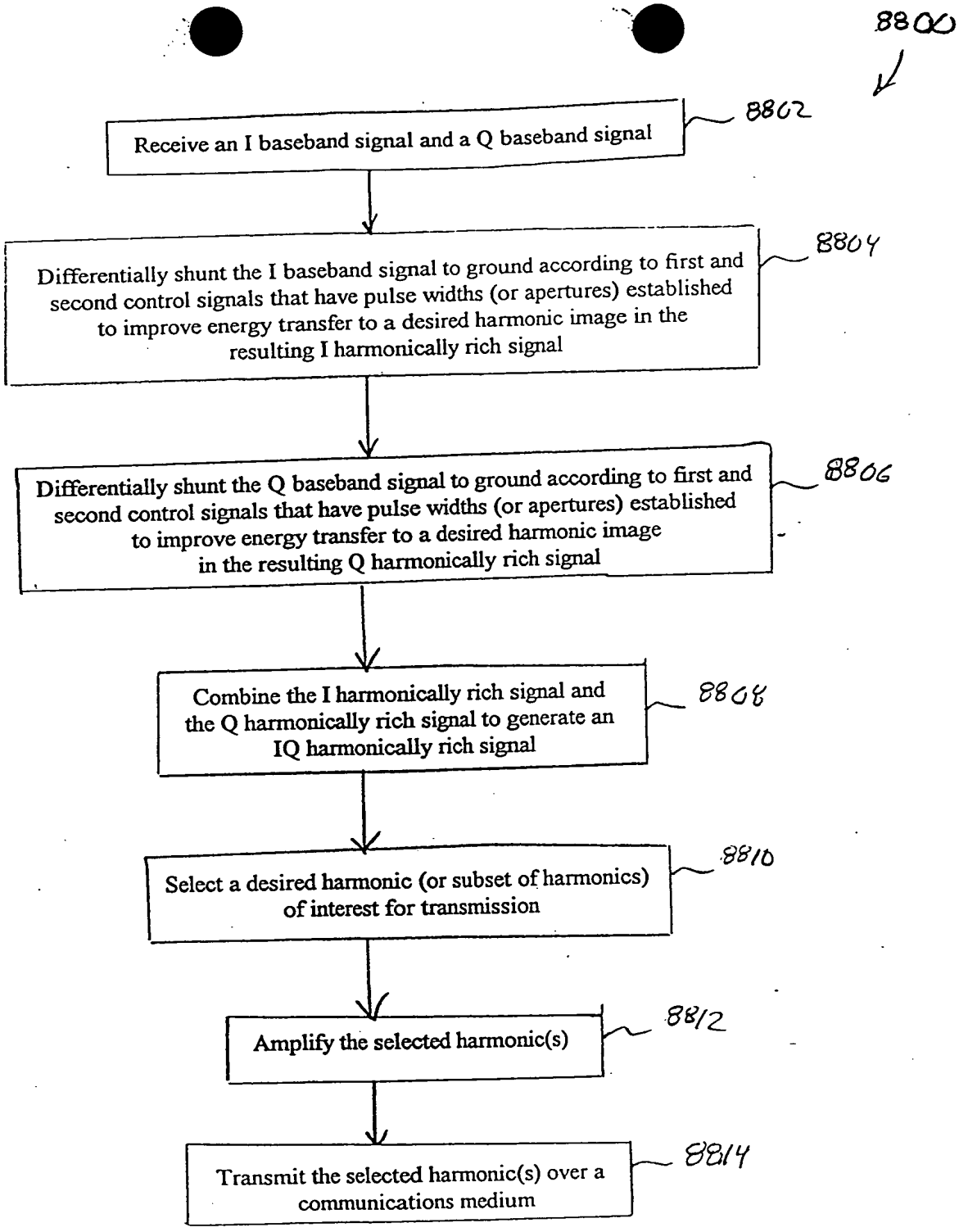

8800
Receive an I baseband signal and a Q baseband signal
8802
Differentially shunt the I baseband signal to ground according to first and second control signals that have pulse widths (or apertures) established to improve energy transfer to a desired harmonic image in the resulting I harmonically rich signal
8804
Differentially shunt the Q baseband signal to ground according to first and second control signals that have pulse widths (or apertures) established to improve energy transfer to a desired harmonic image in the resulting Q harmonically rich signal
8806
Combine the I harmonically rich signal and the Q harmonically rich signal to generate an IQ harmonically rich signal
8808
Select a desired harmonic (or subset of harmonics) of interest for transmission
8810
Amplify the selected harmonic(s)
8812
Transmit the selected harmonic(s) over a communications medium
8814

FIG. 88

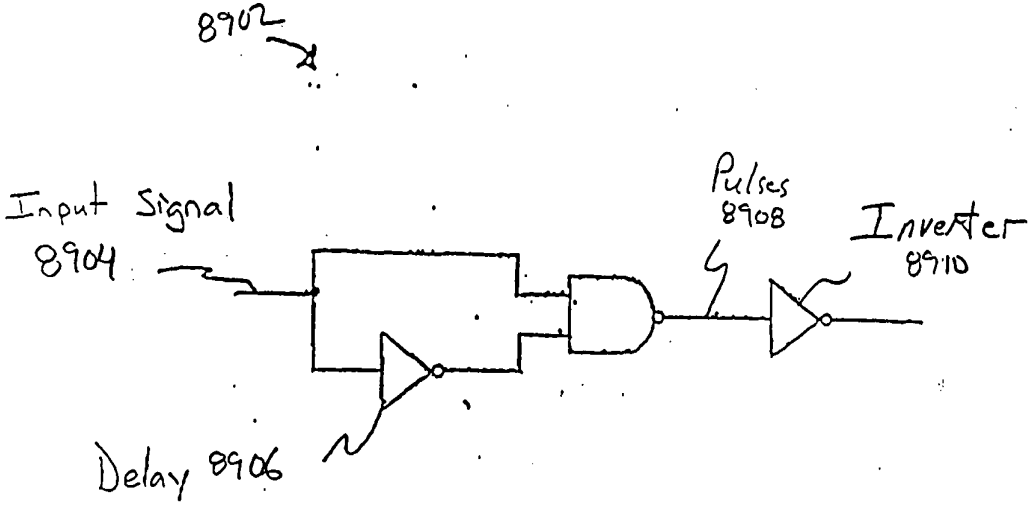


FIG. 89A

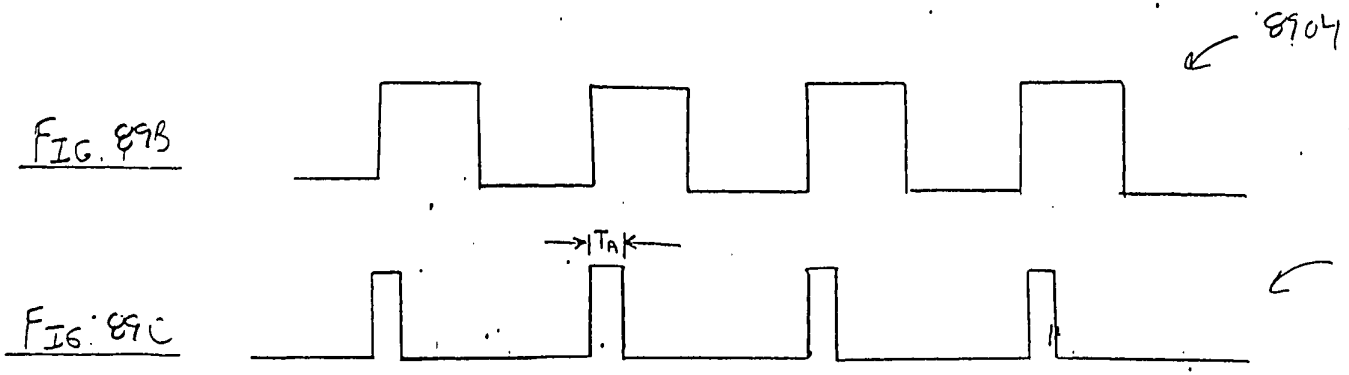
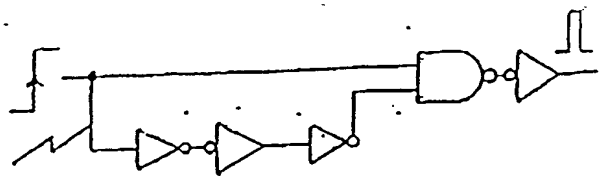


FIG. 89B

FIG. 89C

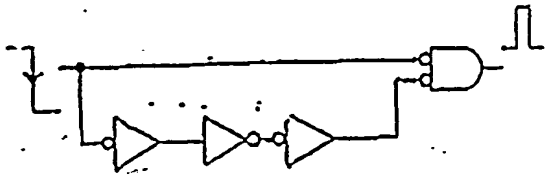
8912



A. rising edge pulse generator

FIG. 89D

8916



B. falling-edge pulse generator

FIG. 89E

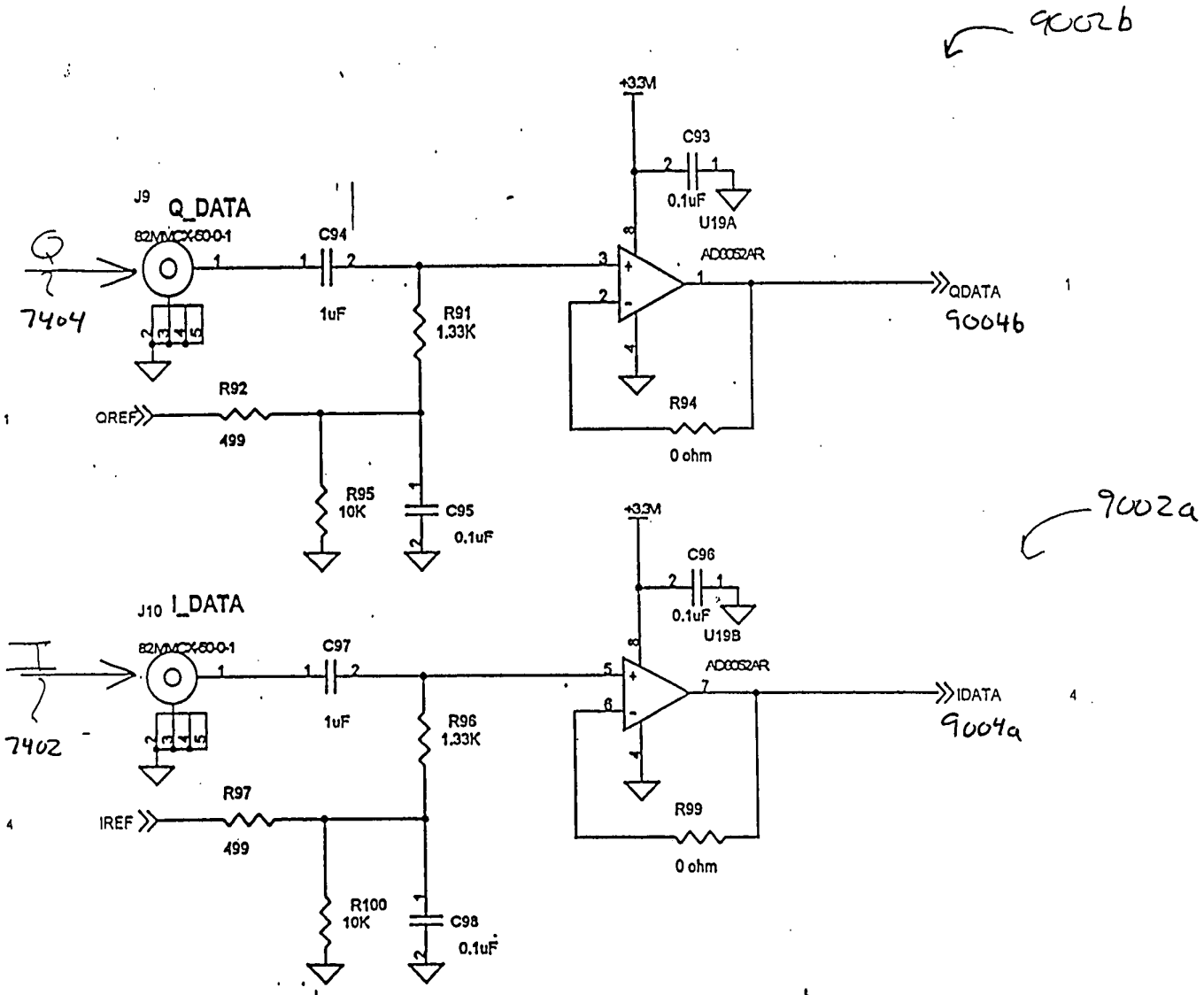

9002b
+3.3M
C93
0.1uF
U19A
J9
Q_DATA
82MMCX-50-0-1
C94
1uF
AD8052AR
QDATA
9004b
7404
R91
1.33K
R92
QREF
499
R94
0 ohm
R95
10K
C95
0.1uF
9002a
+3.3M
C96
0.1uF
U19B
J10
I_DATA
82MMCX-50-0-1
C97
1uF
AD8052AR
IDATA
9004a
7402
R96
1.33K
R97
IREF
499
R99
0 ohm
R100
10K
C98
0.1uF

FIG. 90A

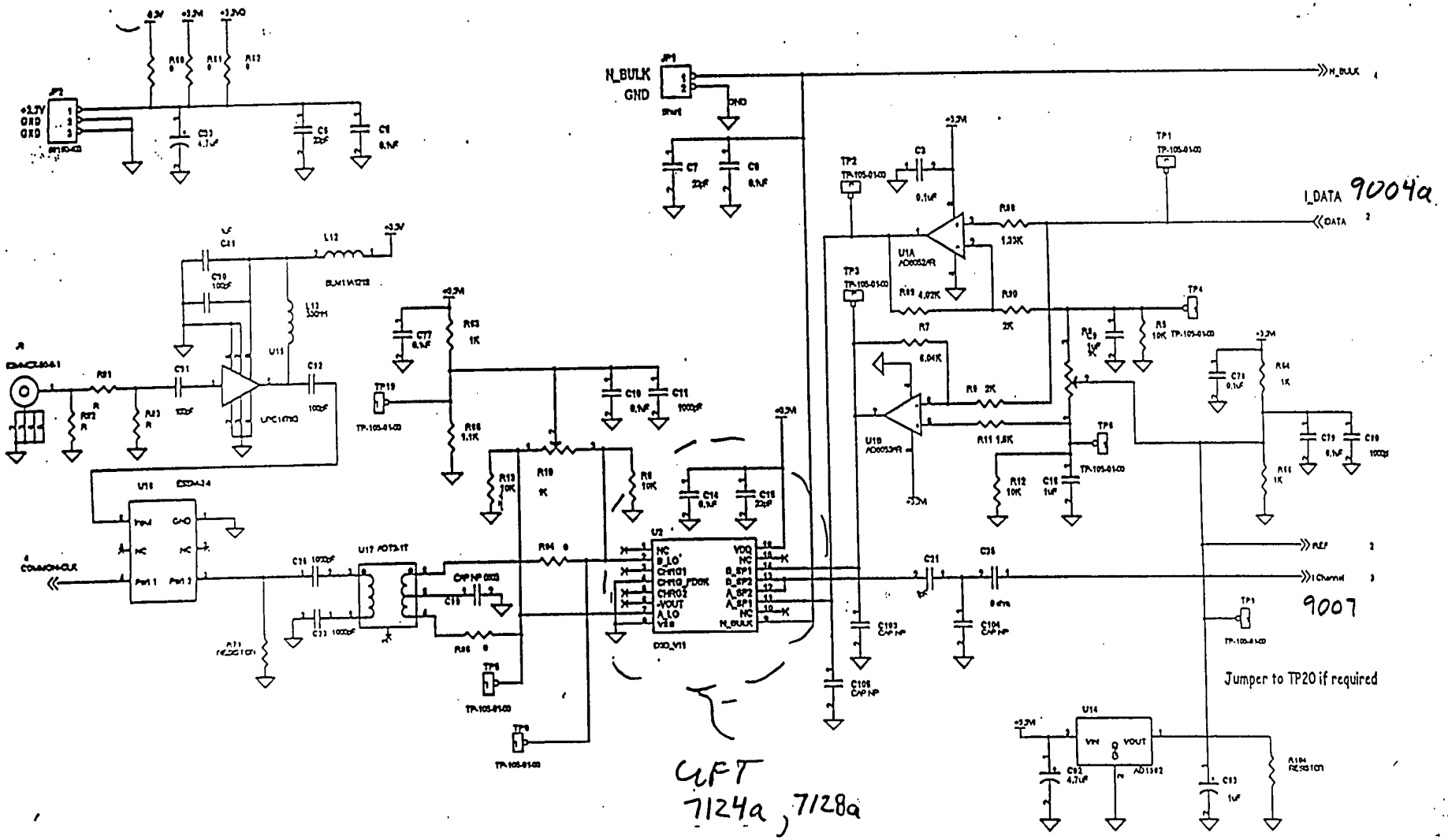

N_BULK
GND
I_DATA 9004a
Jumper to TP20 if required
9007
I Channel
9006
4FT
7124a, 7128a

FIG. 90B

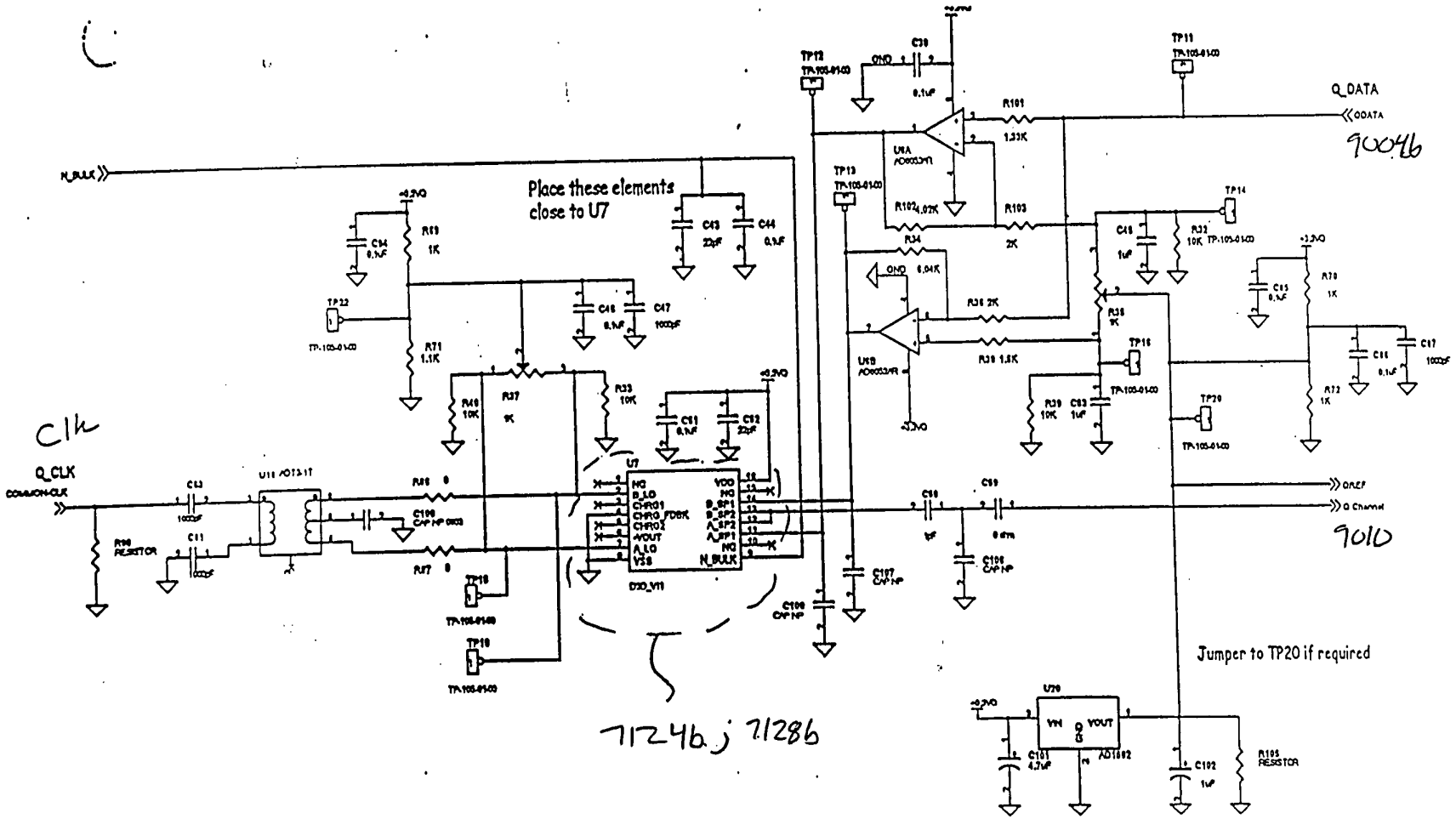

Place these elements close to U7
Clk
Q_CLK
Q_DATA
9004b
9010
Jumper to TP20 if required
71246 ; 71286
Q Channel
9008

FIG. 90C

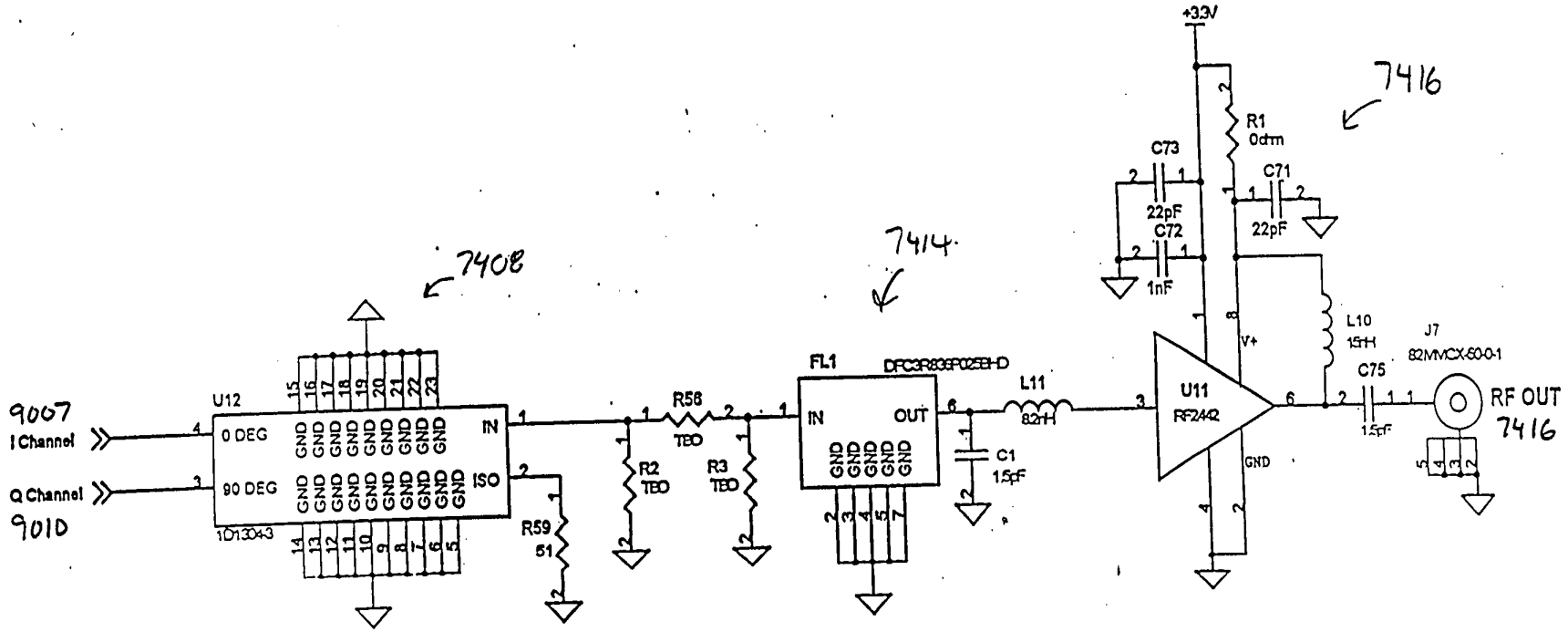


FIG. 9D

Combiner
9012

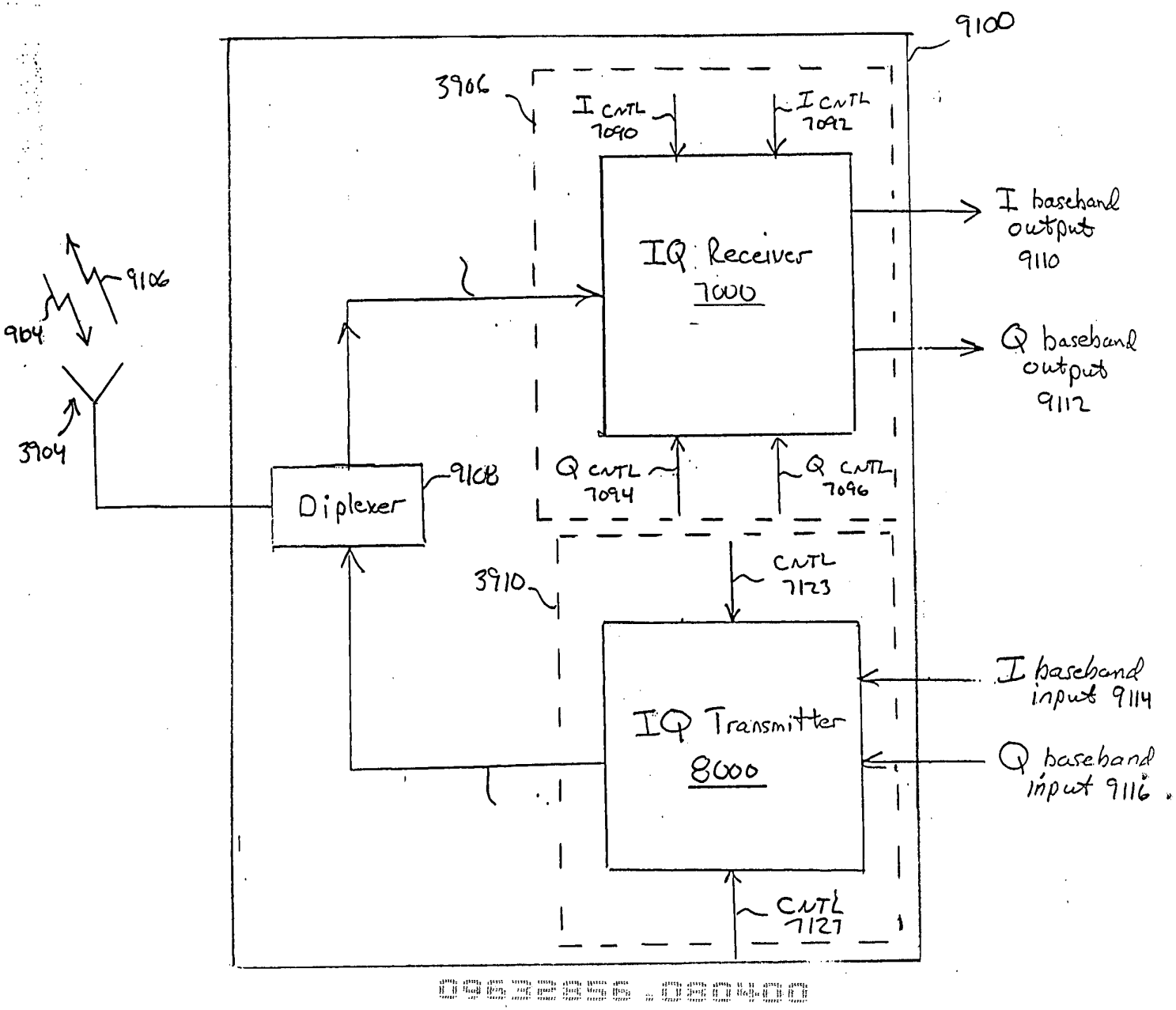
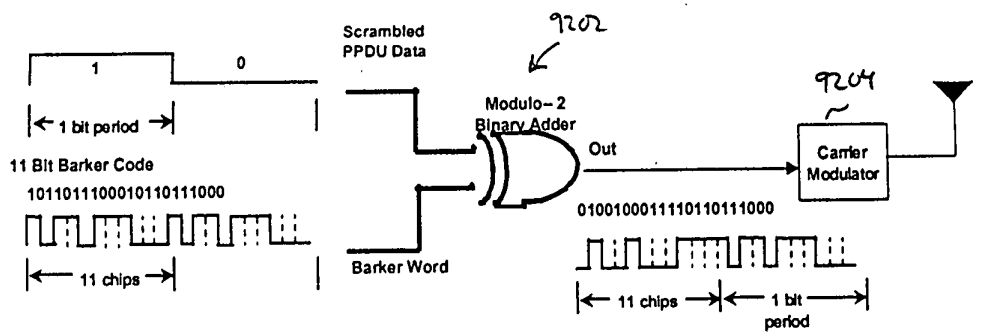

9100
3906
I CNTL 7090
I CNTL 7092
IQ Receiver 7000
I baseband output 9110
Q baseband output 9112
9106
904
3904
Diplexer
9108
Q CNTL 7094
Q CNTL 7096
CNTL 7123
3910
IQ Transmitter 8000
I baseband input 9114
Q baseband input 9116
CNTL 7127

FIG. 91


9202
Scrambled
PPDU Data
1
0
1 bit period
11 Bit Barker Code
10110111000101101110000
11 chips
Barker Word
Modulo-2
Binary Adder
Out
9204
Carrier
Modulator
01001000111101101110000
11 chips
1 bit
period

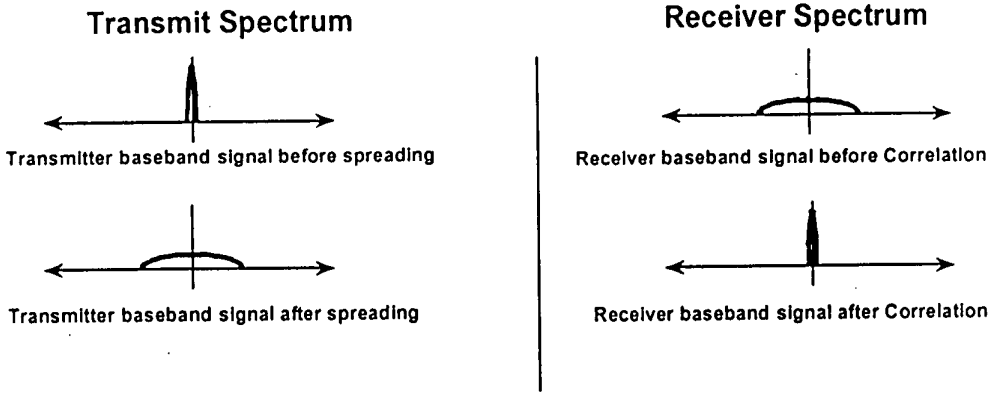

Transmit Spectrum
Transmitter baseband signal before spreading
Transmitter baseband signal after spreading
Receiver Spectrum
Receiver baseband signal before Correlation
Receiver baseband signal after Correlation

FIG 92

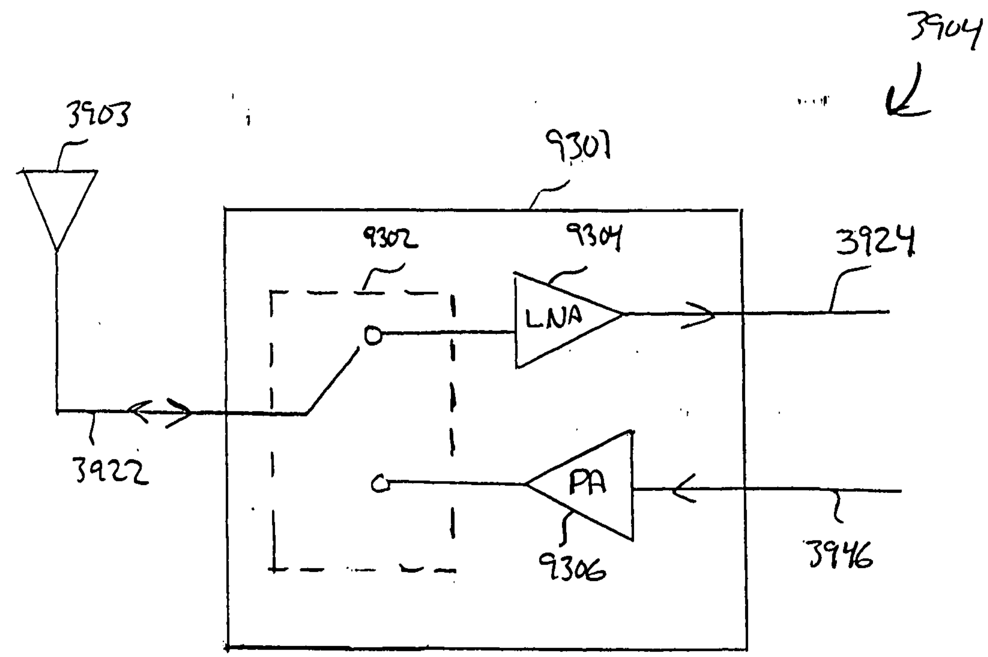


FIG. 93

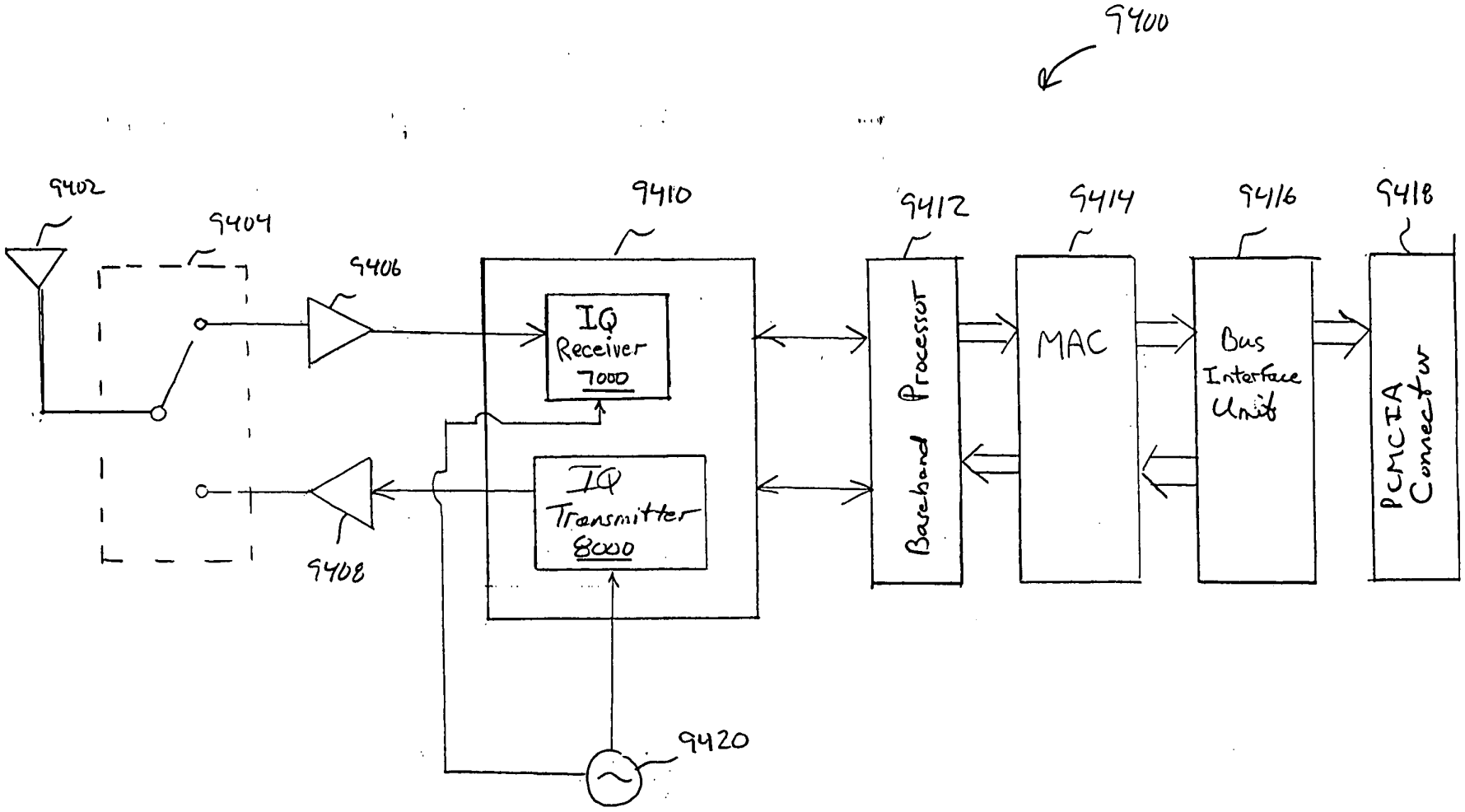

9400
9402
9404
9406
9408
9410
IQ Receiver 7000
IQ Transmitter 8000
9412
Baseband Processor
9414
MAC
9416
Bus Interface Unit
9418
PCMCIA Connector
9420

FIG. 94

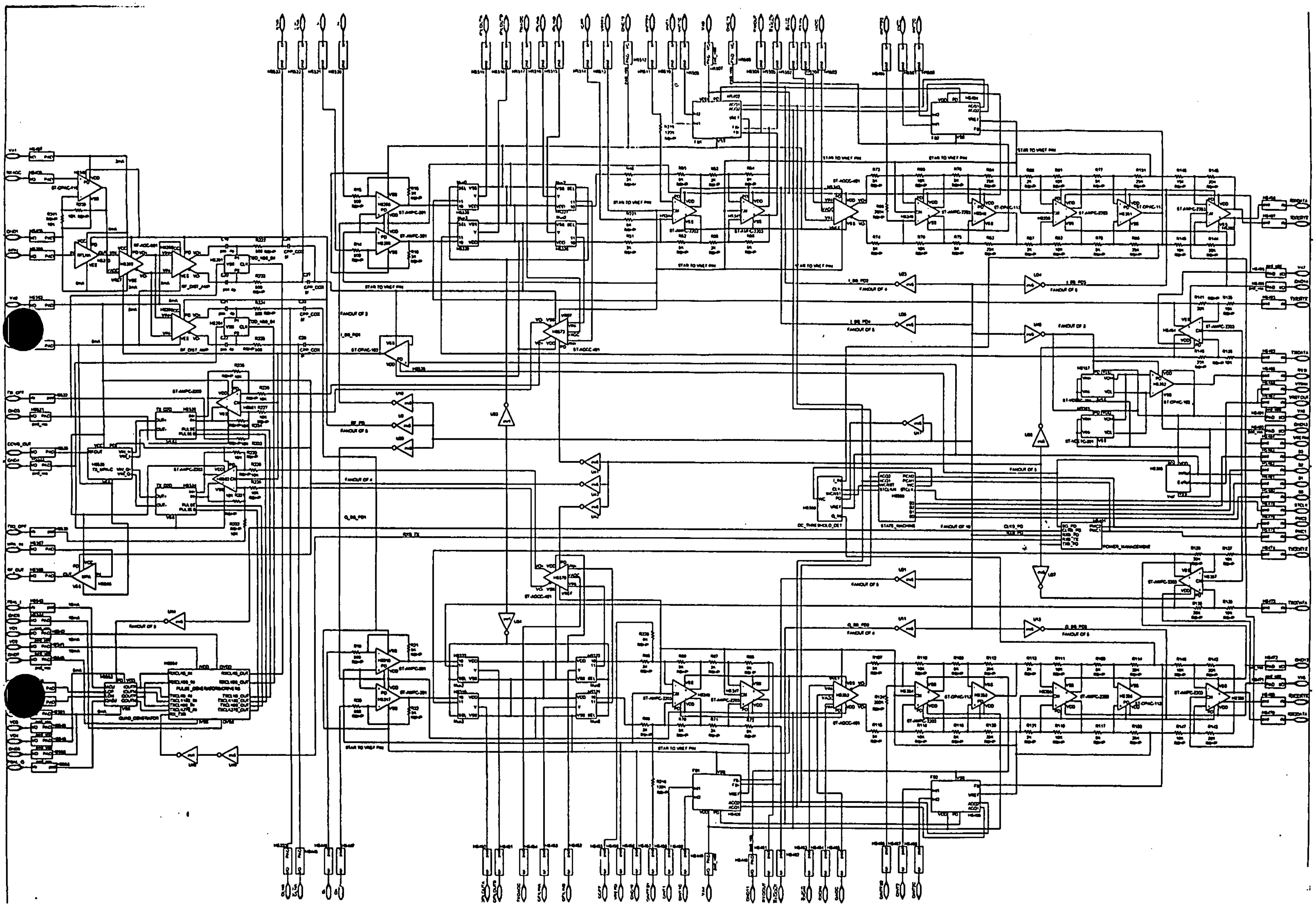


FIG. 95A

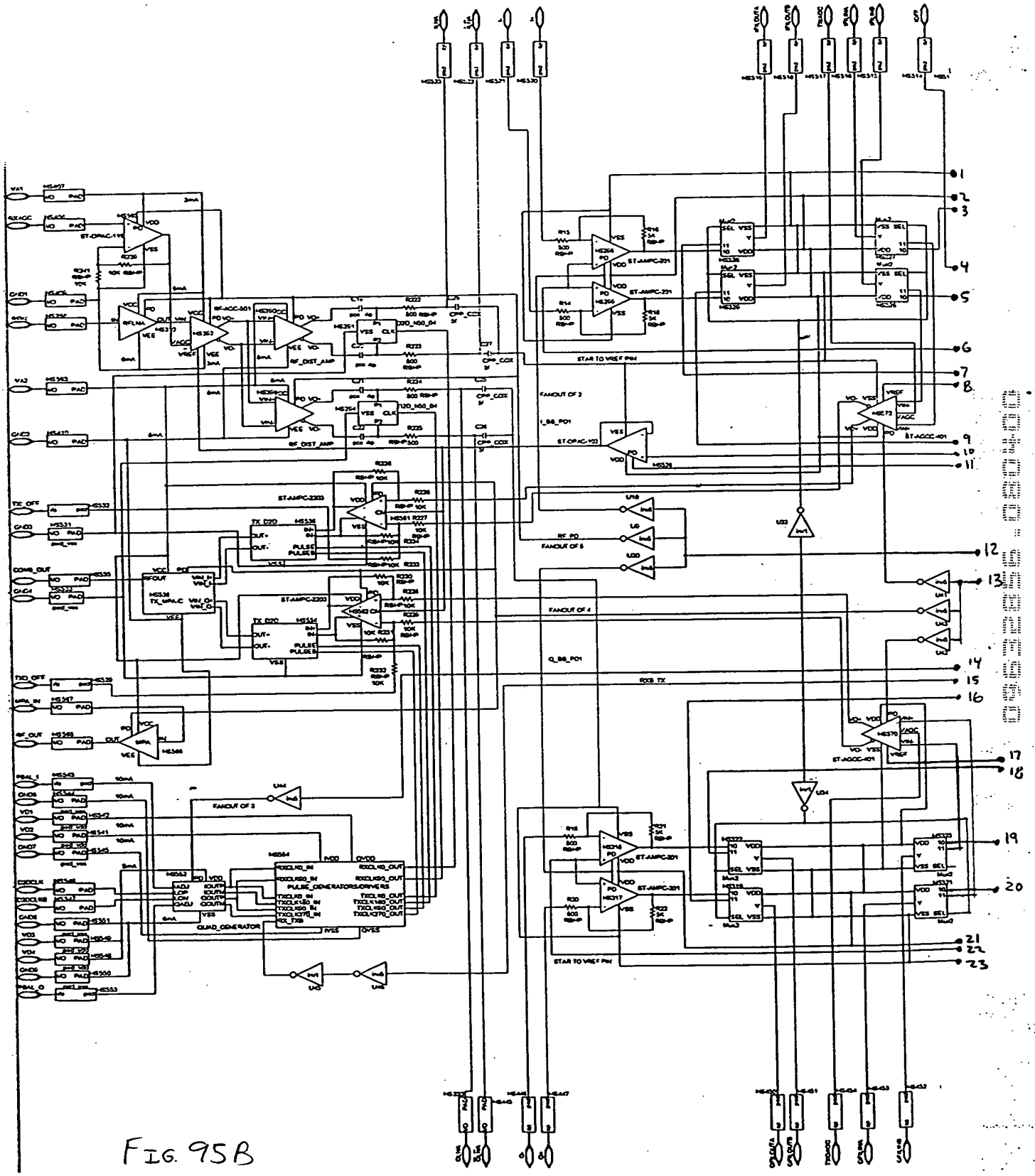


FIG. 95B

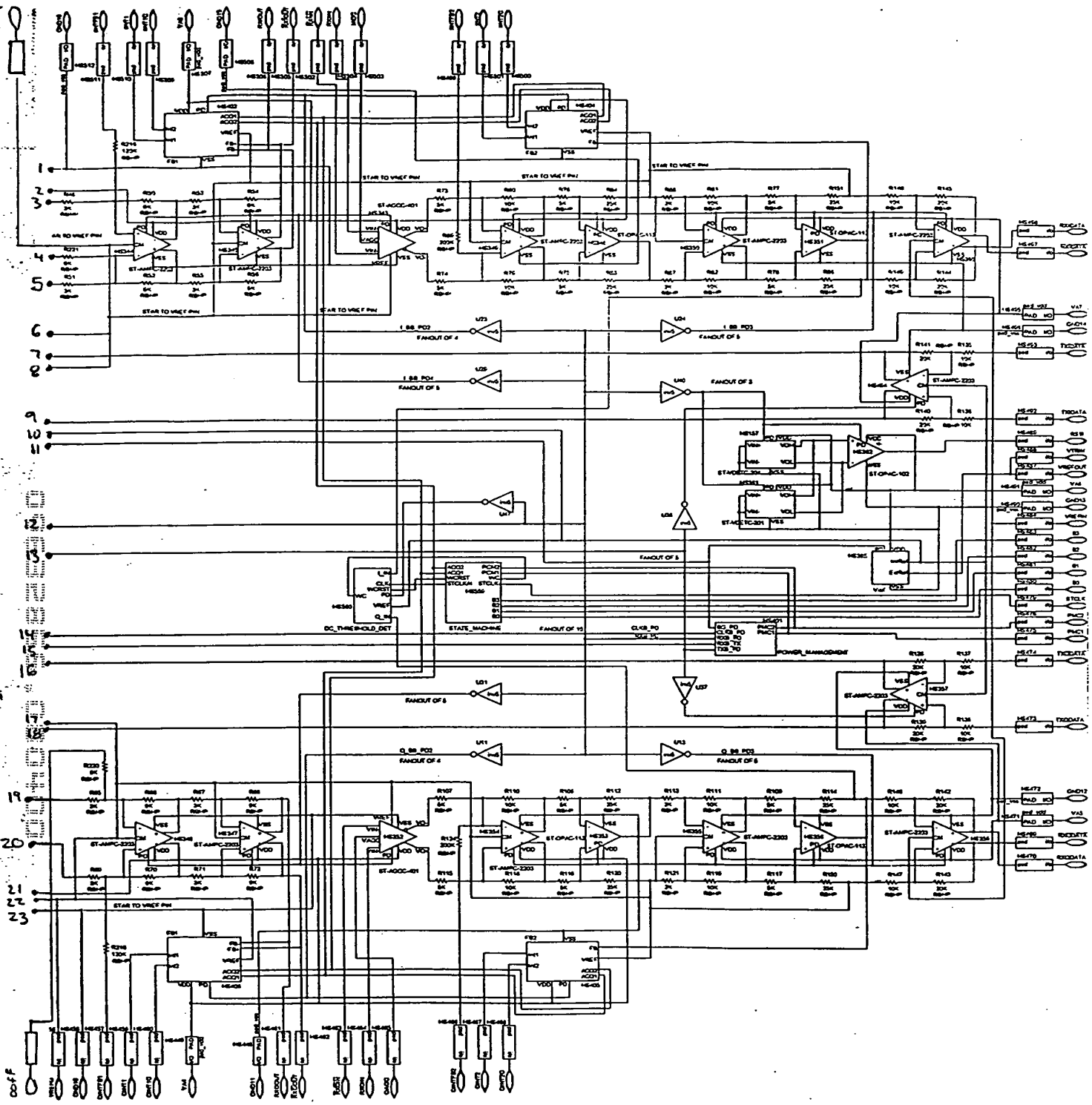


FIG. 95C

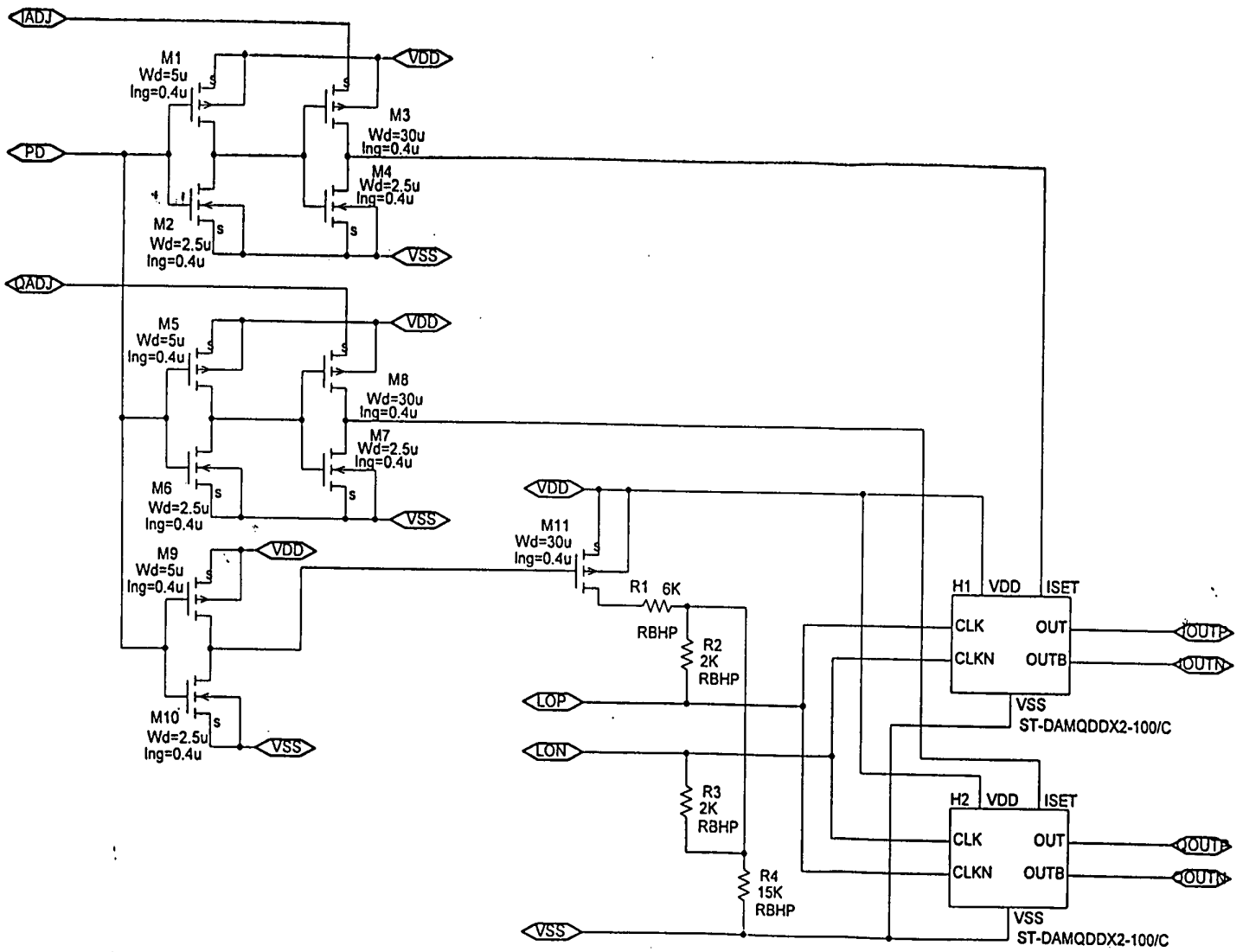

IADJ
PD
QADJ
VDD
VSS
M1
Wd=5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M3
Wd=30u
lng=0.4u
M4
Wd=2.5u
lng=0.4u
M5
Wd=5u
lng=0.4u
M6
Wd=2.5u
lng=0.4u
M7
Wd=2.5u
lng=0.4u
M8
Wd=30u
lng=0.4u
M9
Wd=5u
lng=0.4u
M10
Wd=2.5u
lng=0.4u
M11
Wd=30u
lng=0.4u
R1 6K
RBHP
R2
2K
RBHP
R3
2K
RBHP
R4
15K
RBHP
LOP
LON
H1 VDD ISET
CLK
CLKN
OUT
OUTB
VSS
ST-DAMQDDX2-100/C
H2 VDD ISET
CLK
CLKN
OUT
OUTB
VSS
ST-DAMQDDX2-100/C
OUTP
OUTN
OUTP
OUTN

FIG. 96

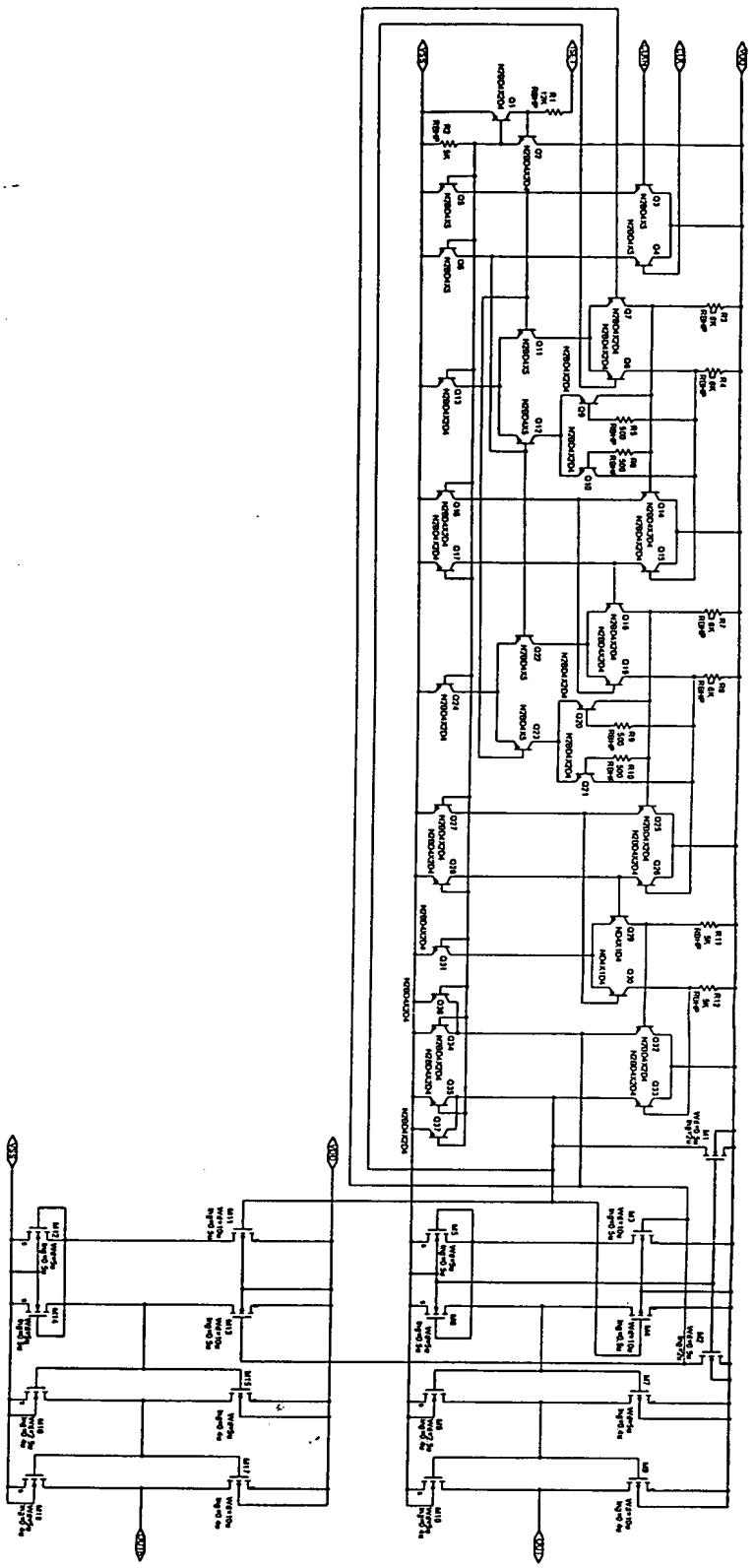


FIG. 17

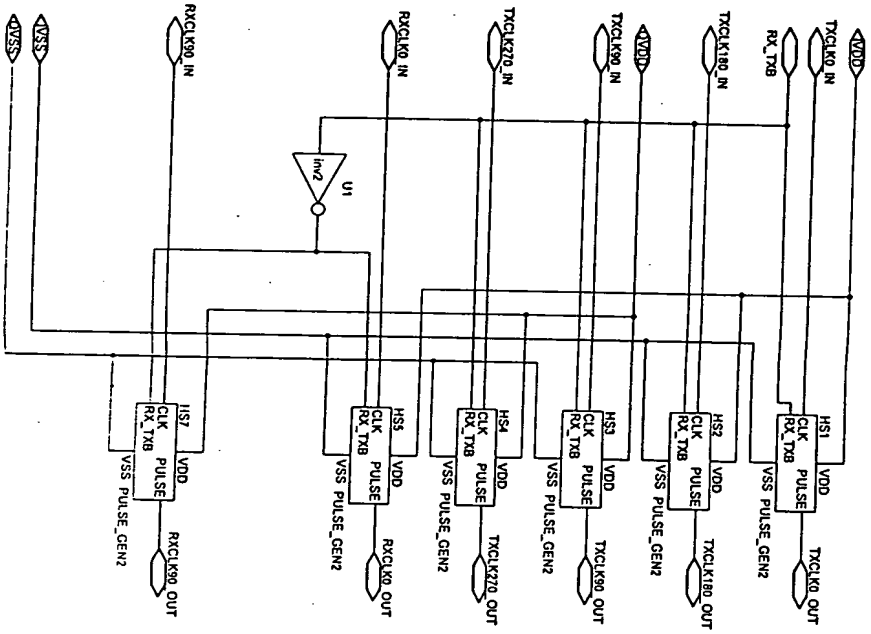

VDD
TXCLK0_IN
RX_TXB
TXCLK180_IN
TXCLK90_IN
VDD
TXCLK270_IN
RXCLK0_IN
VSS
VSS
RXCLK90_IN
inv2
U1
HS1
CLK
RX_TXB
PULSE
VDD
VSS PULSE_GEN2
TXCLK0_OUT
HS2
TXCLK180_OUT
HS3
TXCLK90_OUT
HS4
TXCLK270_OUT
HS5
RXCLK0_OUT
HS7
RXCLK90_OUT

FIG. 5B

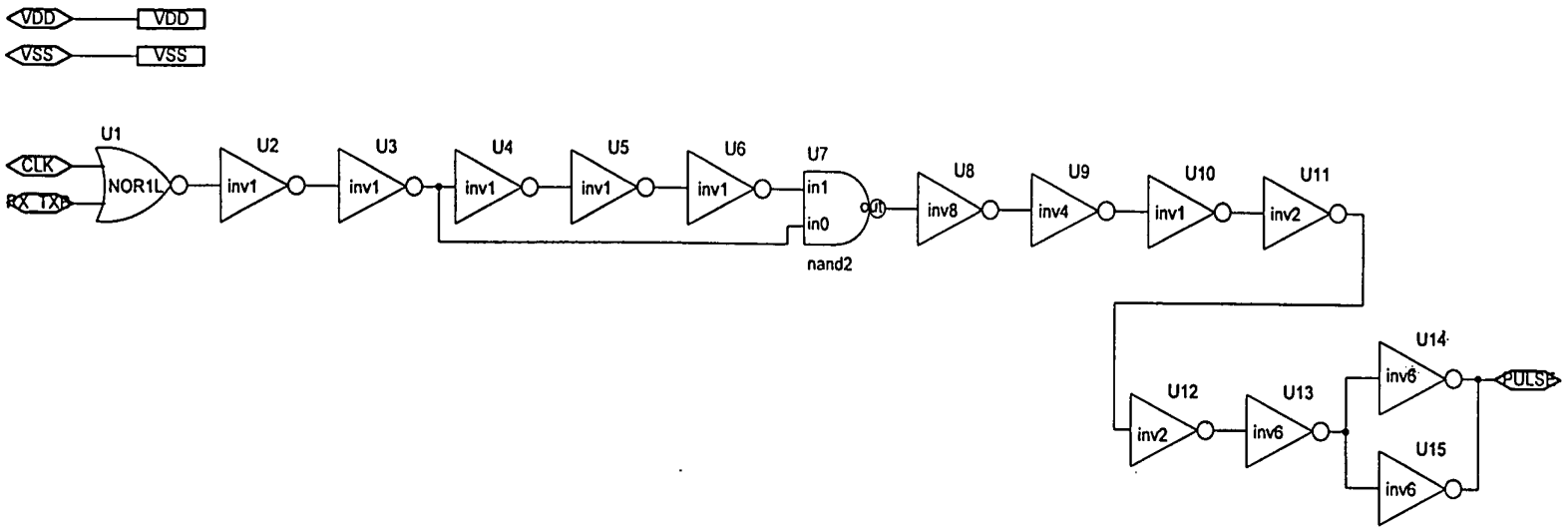

VDD
VDD
VSS
VSS
U1
CLK
RX_TX
NOR1L
U2
inv1
U3
inv1
U4
inv1
U5
inv1
U6
inv1
U7
in1
in0
nand2
U8
inv8
U9
inv4
U10
inv1
U11
inv2
U12
inv2
U13
inv6
U14
inv6
U15
inv6
PULSE

FIG. 9q

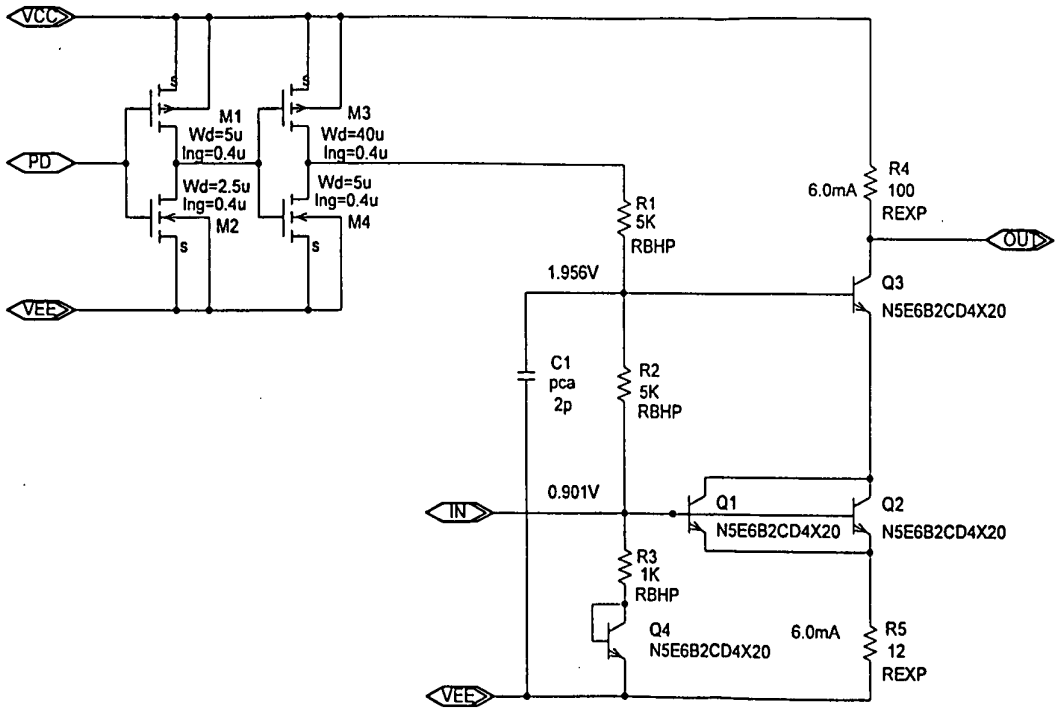

VCC
PD
VEE
M1
Wd=5u
lng=0.4u
Wd=2.5u
lng=0.4u
M2
s
M3
Wd=40u
lng=0.4u
Wd=5u
lng=0.4u
M4
s
R1
5K
RBHP
1.956V
C1
pca
2p
R2
5K
RBHP
0.901V
IN
R3
1K
RBHP
Q4
N5E6B2CD4X20
6.0mA
R4
6.0mA
100
REXP
OUT
Q3
N5E6B2CD4X20
Q1
N5E6B2CD4X20
Q2
N5E6B2CD4X20
R5
12
REXP
VEE

FIG. 10C

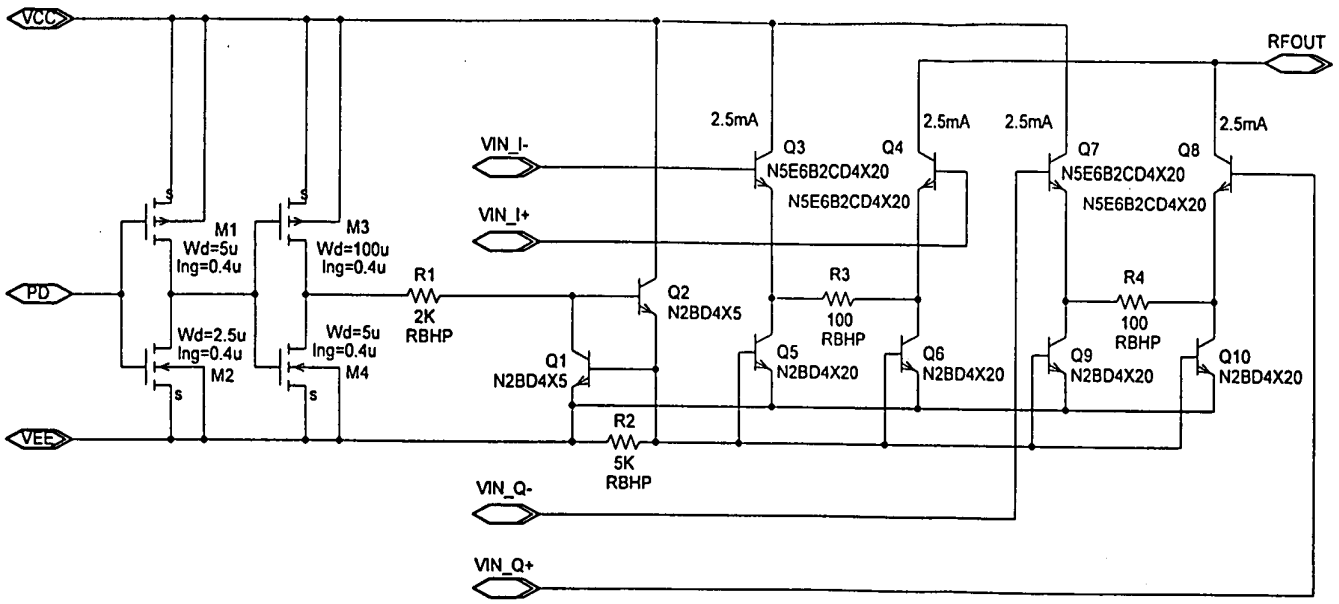

VCC
PD
VEE
M1
Wd=5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M3
Wd=100u
lng=0.4u
M4
Wd=5u
lng=0.4u
R1
2K
RBHP
R2
5K
RBHP
R3
100
RBHP
R4
100
RBHP
Q1
N2BD4X5
Q2
N2BD4X5
Q3
N5E6B2CD4X20
Q4
N5E6B2CD4X20
Q5
N2BD4X20
Q6
N2BD4X20
Q7
N5E6B2CD4X20
Q8
N5E6B2CD4X20
Q9
N2BD4X20
Q10
N2BD4X20
2.5mA
2.5mA
2.5mA
2.5mA
VIN_I-
VIN_I+
VIN_Q-
VIN_Q+
RFOUT

FIG. 101

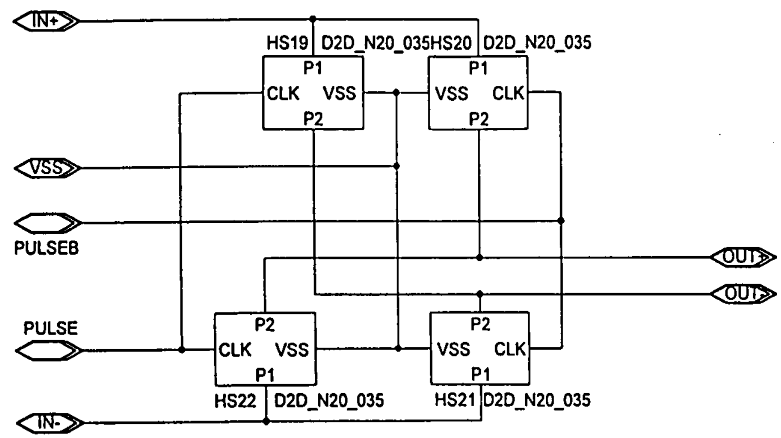


FIG. 102

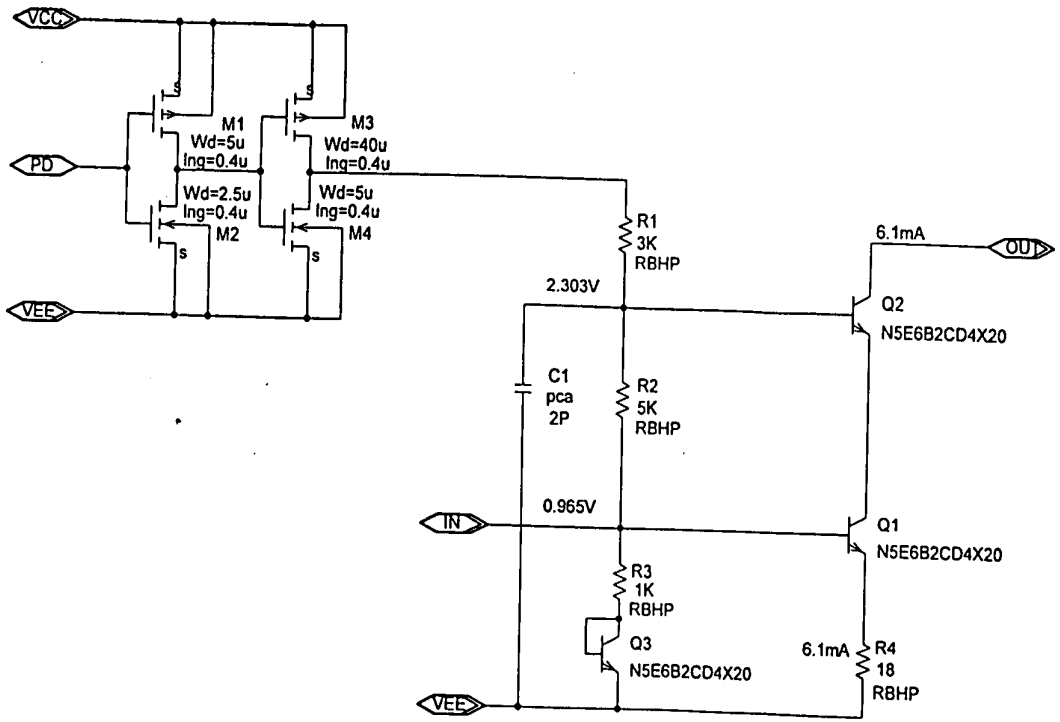

VCC
PD
VEE
M1
Wd=5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M3
Wd=40u
lng=0.4u
M4
Wd=5u
lng=0.4u
R1
3K
RBHP
2.303V
6.1mA
OUT
Q2
N5E6B2CD4X20
C1
pca
2P
R2
5K
RBHP
0.965V
IN
Q1
N5E6B2CD4X20
R3
1K
RBHP
Q3
N5E6B2CD4X20
6.1mA
R4
18
RBHP
VEE

FIG. 10J

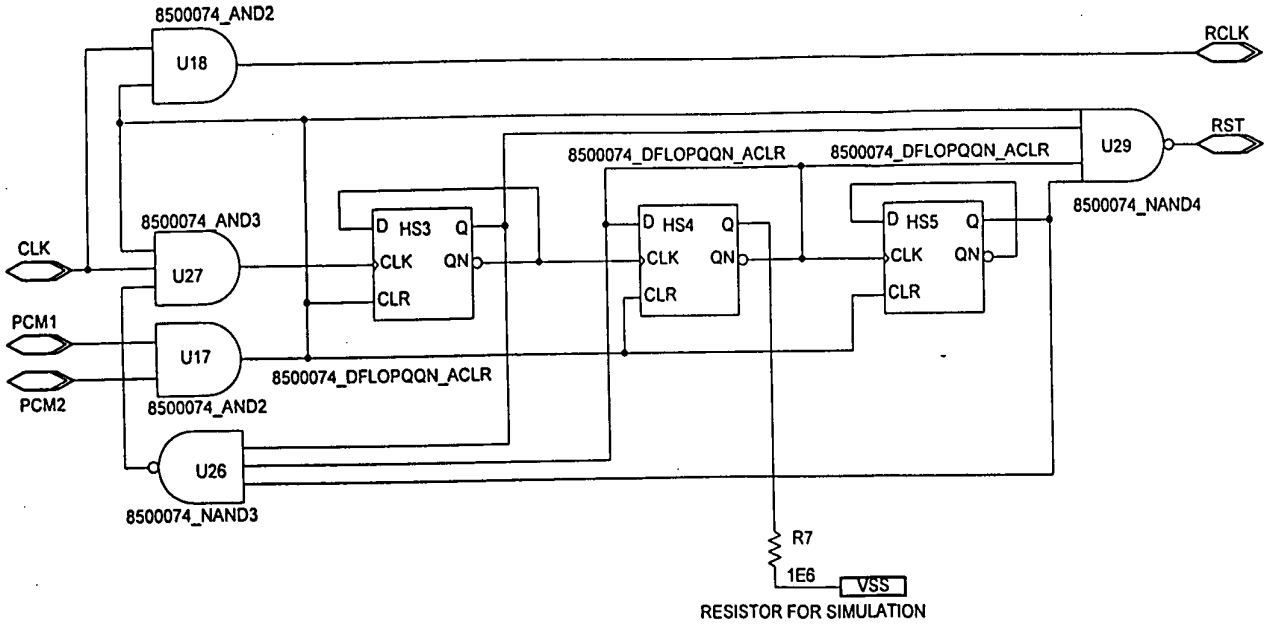


FIG. 104

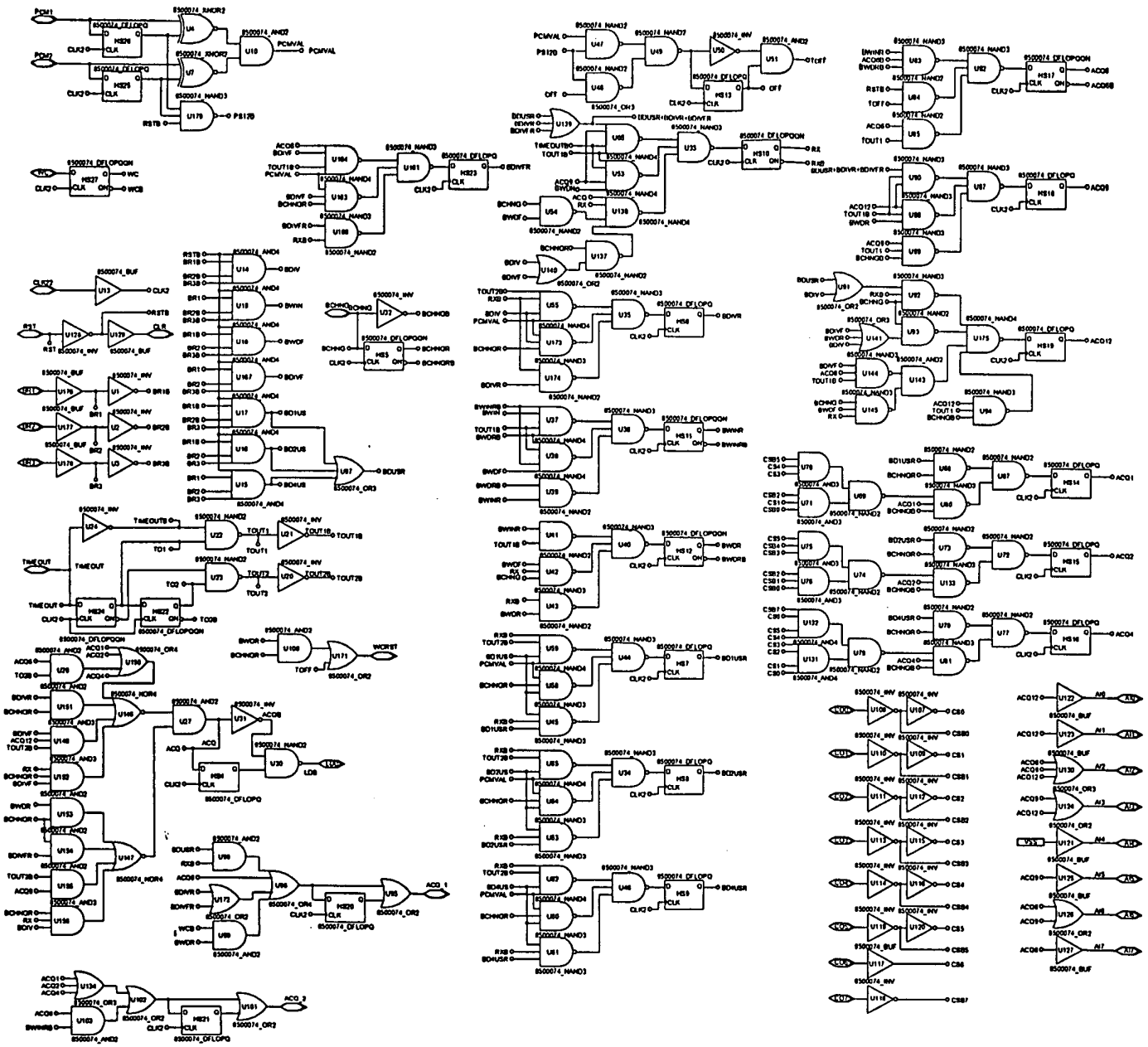


FIG. 105

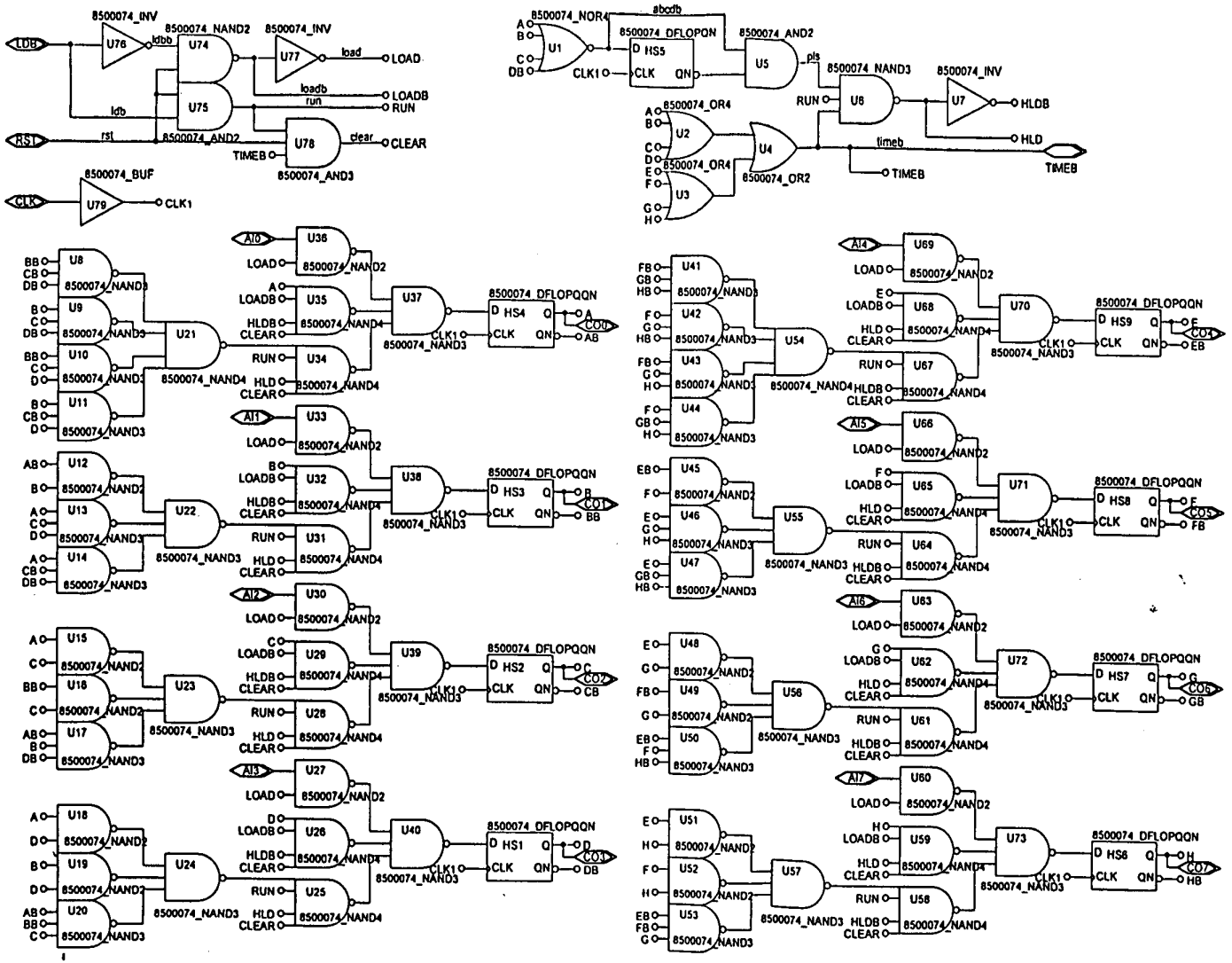

LDB
RST
CLK
8500074_INV
U76
ldbb
8500074_NAND2
U74
U75
8500074_INV
U77
load
LOAD
loadb
LOADB
run
RUN
ldb
rst
8500074_AND2
U78
clear
CLEAR
TIMEB
8500074_AND3
8500074_BUF
U79
CLK1
8500074_NOR4
U1
abcdb
8500074_DFLOPQN
D HS5
CLK QN
CLK1
8500074_AND2
U5
pls
8500074_NAND3
U6
RUN
8500074_INV
U7
HLDB
HLD
TIMEB
8500074_OR4
U2
U3
8500074_OR4
U4
8500074_OR2
timeb
TIMEB
AI0
AI1
AI2
AI3
AI4
AI5
AI6
AI7
LOAD
LOADB
HLDB
CLEAR
RUN
HLD
8500074_NAND2
8500074_NAND4
8500074_NAND3
U8
U9
U10
U11
U21
U12
U13
U14
U22
U15
U16
U17
U23
U18
U19
U20
U24
U36
U35
U34
U37
U33
U32
U31
U38
U30
U29
U28
U39
U27
U26
U25
U40
U41
U42
U43
U44
U54
U69
U68
U67
U70
U66
U65
U64
U71
U63
U62
U61
U72
U60
U59
U58
U73
U45
U46
U47
U55
U48
U49
U50
U56
U51
U52
U53
U57
8500074_DFLOPQQN
D HS4 Q
D HS3 Q
D HS2 Q
D HS1 Q
D HS9 Q
D HS8 Q
D HS7 Q
D HS6 Q
CLK QN
CLK1
A
AB
B
BB
C
CB
D
DB
E
EB
F
FB
G
GB
H
HB
CO1
CO2
CO3
CO4
CO5
CO6
CO7

FIG 10G

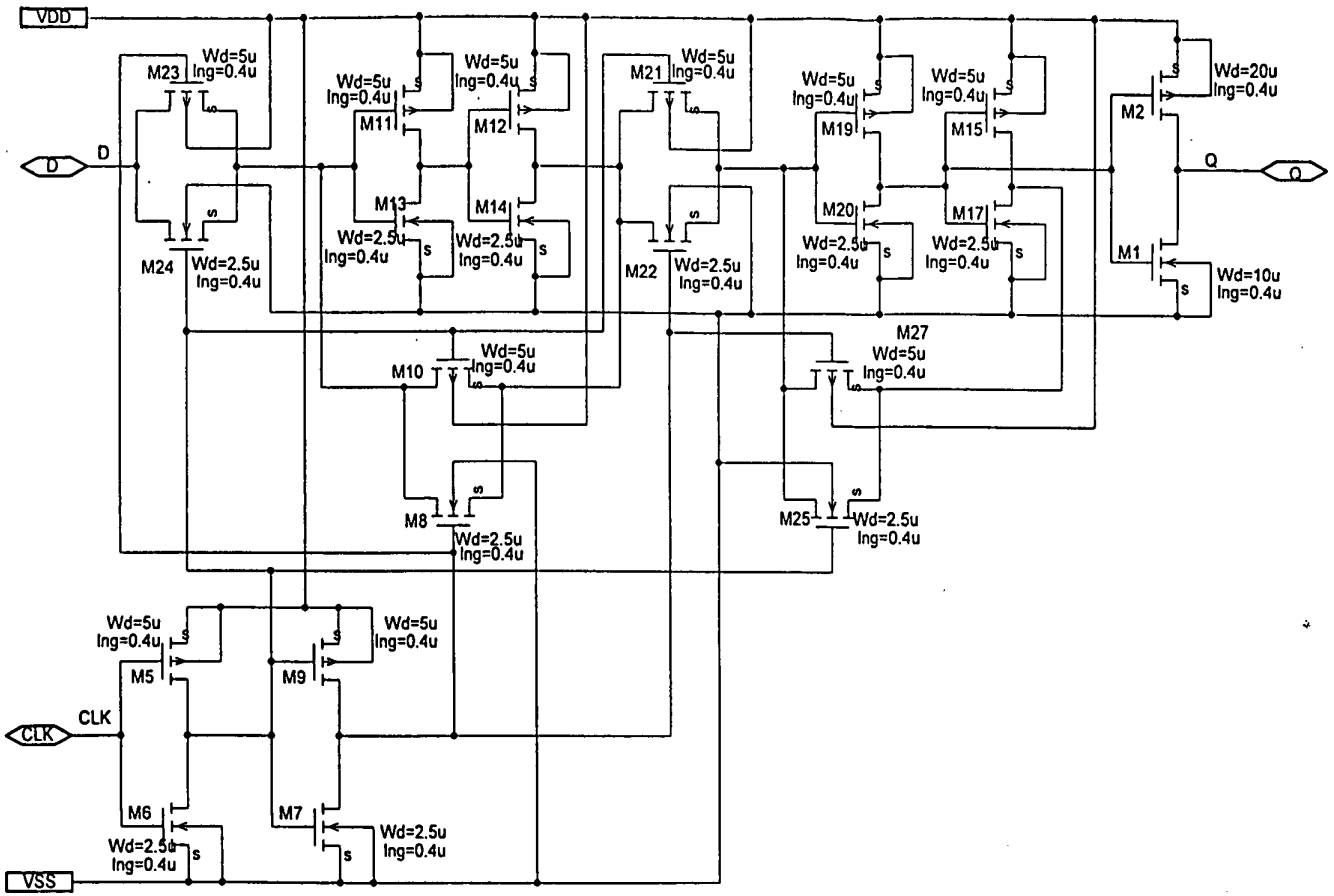

VDD
D
CLK
VSS
Q
M23
M24
M11
M12
M13
M14
M21
M22
M19
M20
M15
M17
M2
M1
M10
M27
M8
M25
M5
M9
M6
M7
Wd=5u
lng=0.4u
Wd=2.5u
lng=0.4u
Wd=20u
lng=0.4u
Wd=10u
lng=0.4u

FIG. 107

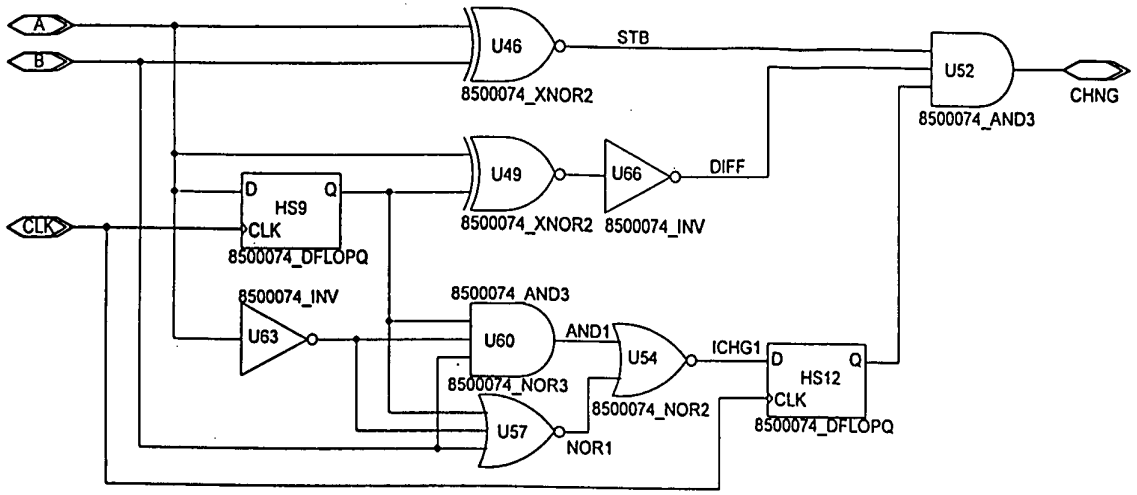

A
B
CLK
U46
8500074_XNOR2
STB
U52
8500074_AND3
CHNG
U49
8500074_XNOR2
U66
8500074_INV
DIFF
D
Q
HS9
CLK
8500074_DFLOPQ
8500074_INV
U63
8500074_AND3
U60
8500074_NOR3
AND1
U54
ICHG1
D
Q
HS12
CLK
8500074_DFLOPQ
8500074_NOR2
U57
NOR1

FIG. 10B

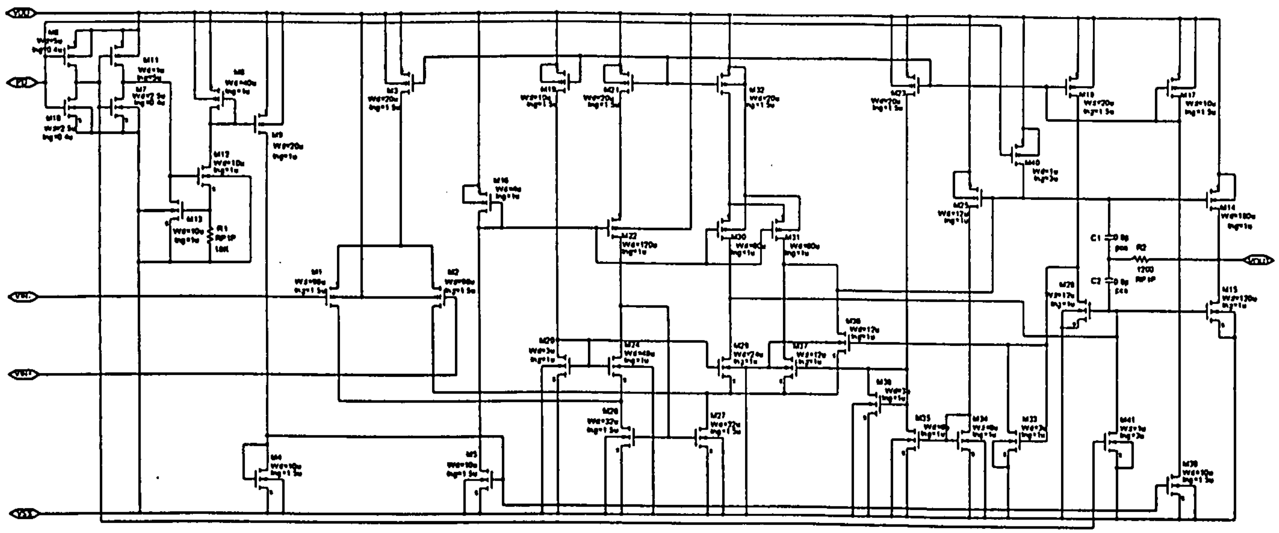


Fig. 109

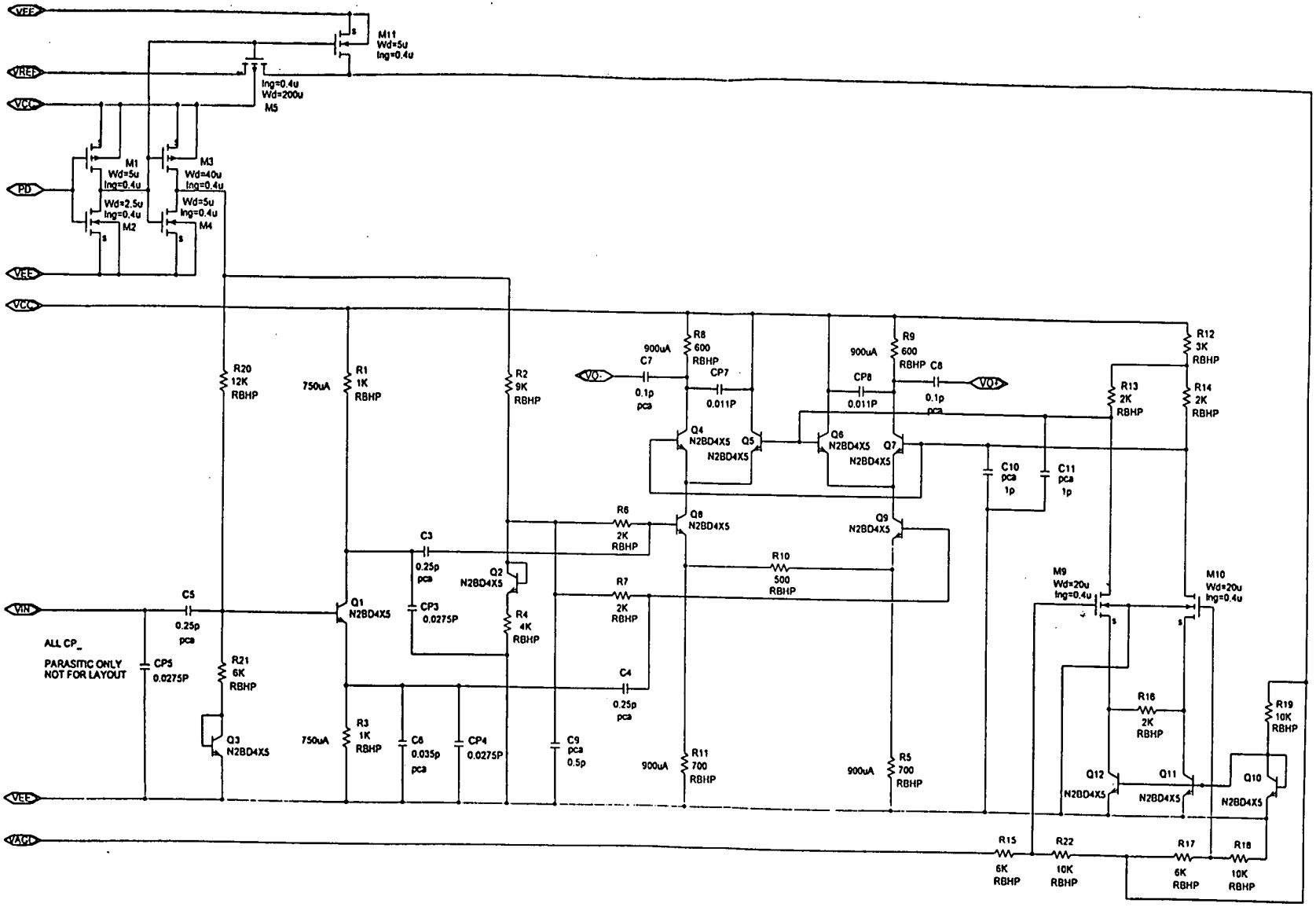

VEP
VREF
VCC
PD
VEE
VCC
VIN
VEE
VAGD
M11
Wd=5u
lng=0.4u
lng=0.4u
Wd=200u
M5
M1
Wd=5u
lng=0.4u
Wd=2.5u
lng=0.4u
M2
M3
Wd=40u
lng=0.4u
Wd=5u
lng=0.4u
M4
R20
12K
RBHP
750uA
R1
1K
RBHP
R2
9K
RBHP
900uA
C7
0.1p
pca
VO-
R8
600
RBHP
CP7
0.011P
900uA
CP8
0.011P
R9
600
RBHP
C8
0.1p
pca
VO+
R12
3K
RBHP
R13
2K
RBHP
R14
2K
RBHP
Q4
N2BD4X5
Q5
N2BD4X5
Q6
N2BD4X5
Q7
N2BD4X5
C10
pca
1p
C11
pca
1p
R6
2K
RBHP
Q8
N2BD4X5
Q9
N2BD4X5
C3
0.25p
pca
Q2
N2BD4X5
R10
500
RBHP
M9
Wd=20u
lng=0.4u
M10
Wd=20u
lng=0.4u
C5
0.25p
pca
ALL CP_
PARASITIC ONLY
NOT FOR LAYOUT
CP5
0.0275P
R21
6K
RBHP
Q1
N2BD4X5
CP3
0.0275P
R4
4K
RBHP
R7
2K
RBHP
C4
0.25p
pca
R16
2K
RBHP
R19
10K
RBHP
Q3
N2BD4X5
750uA
R3
1K
RBHP
C6
0.035p
pca
CP4
0.0275P
C9
pca
0.5p
900uA
R11
700
RBHP
900uA
R5
700
RBHP
Q12
N2BD4X5
Q11
N2BD4X5
Q10
N2BD4X5
R15
6K
RBHP
R22
10K
RBHP
R17
6K
RBHP
R18
10K
RBHP

FIG. 11O

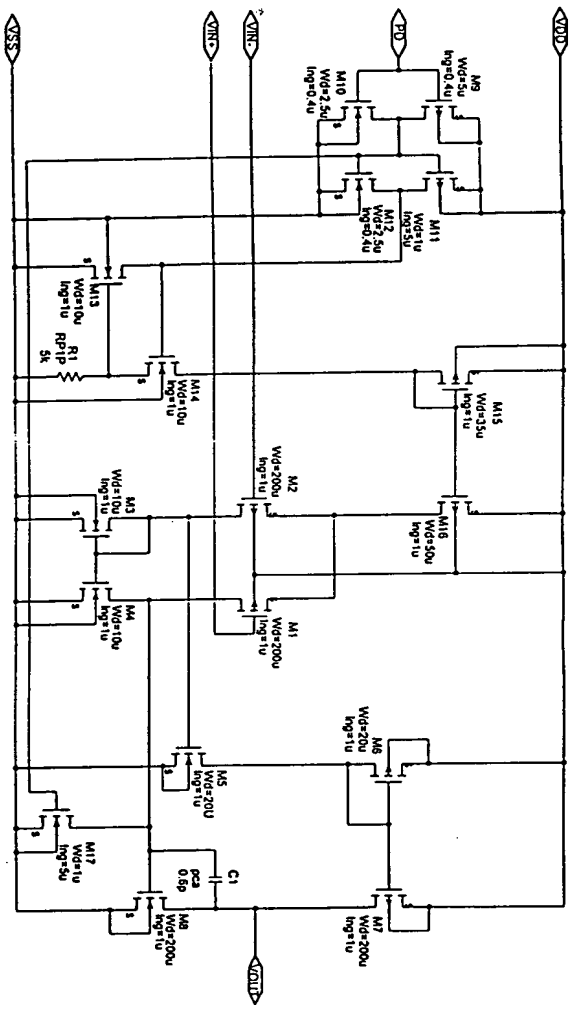

VSS
VIN-
VIN+
VDD
VOUT
M9
Wd=5u
lng=0.4u
M10
Wd=2.5u
lng=0.4u
M12
Wd=2.5u
lng=0.4u
M11
Wd=1u
lng=1u
M13
Wd=10u
lng=1u
R1
RPIP
5k
M14
Wd=10u
lng=1u
M15
Wd=35u
lng=1u
M2
Wd=200u
lng=1u
M3
Wd=10u
lng=1u
M16
Wd=50u
lng=1u
M4
Wd=10u
lng=1u
M1
Wd=200u
lng=1u
M6
Wd=20u
lng=1u
M5
Wd=20U
lng=1u
M17
Wd=1u
lng=1u
C1
pca
0.6p
M8
Wd=200u
lng=1u
M7
Wd=200u
lng=1u

FIG. 111

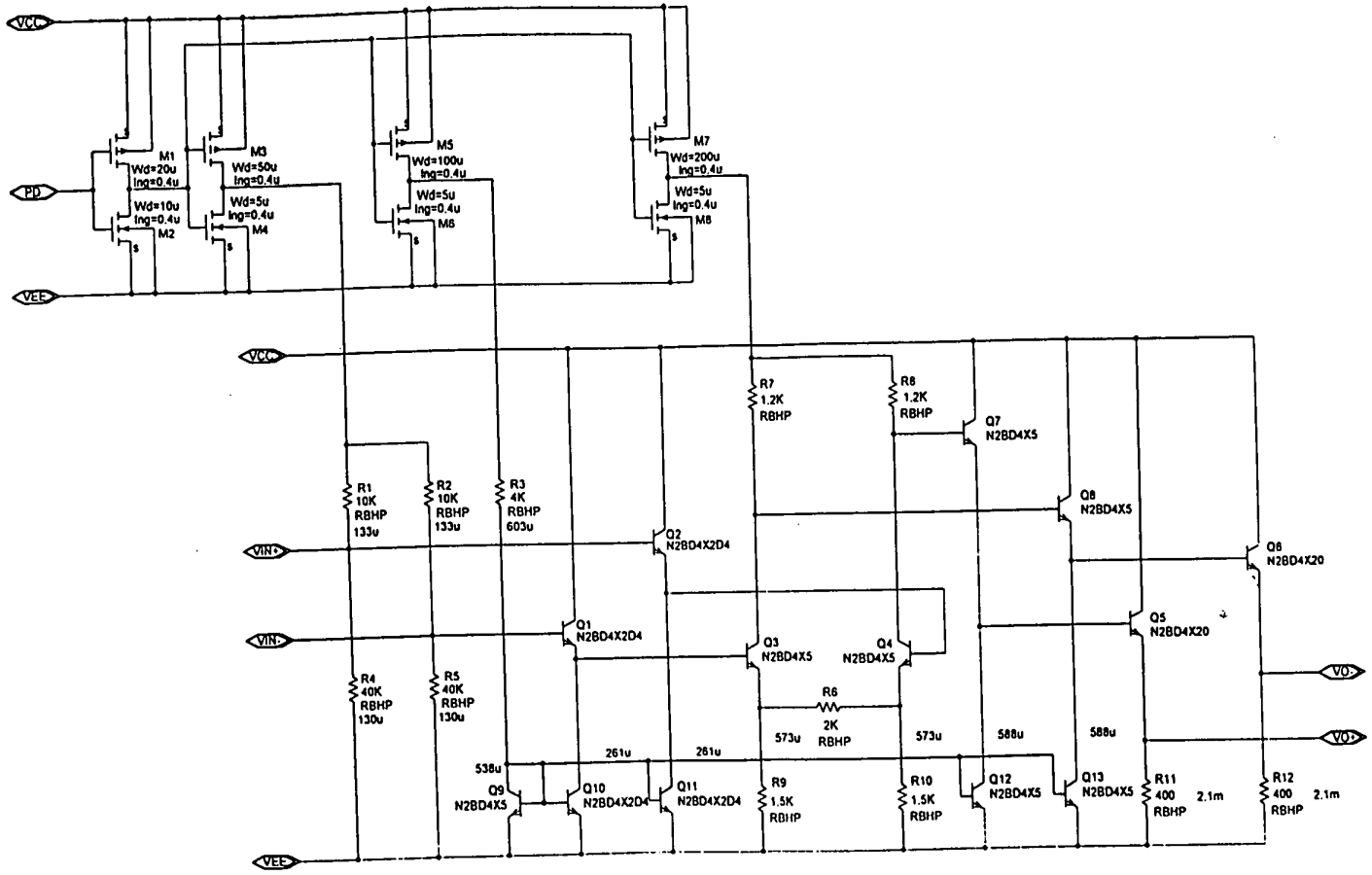

VCC
PD
VEE
M1
Wd=20u
lng=0.4u
M2
Wd=10u
lng=0.4u
M3
Wd=50u
lng=0.4u
M4
Wd=5u
lng=0.4u
M5
Wd=100u
lng=0.4u
M6
Wd=5u
lng=0.4u
M7
Wd=200u
lng=0.4u
M8
Wd=5u
lng=0.4u
R1
10K
RBHP
133u
R2
10K
RBHP
133u
R3
4K
RBHP
603u
R4
40K
RBHP
130u
R5
40K
RBHP
130u
R6
2K
RBHP
R7
1.2K
RBHP
R8
1.2K
RBHP
R9
1.5K
RBHP
R10
1.5K
RBHP
R11
400
RBHP
2.1m
R12
400
RBHP
2.1m
Q1
N2BD4X2D4
Q2
N2BD4X2D4
Q3
N2BD4X5
Q4
N2BD4X5
Q5
N2BD4X20
Q6
N2BD4X20
Q7
N2BD4X5
Q8
N2BD4X5
Q9
N2BD4X5
Q10
N2BD4X2D4
Q11
N2BD4X2D4
Q12
N2BD4X5
Q13
N2BD4X5
VIN+
VIN-
VO-
VO+
538u
261u
261u
573u
573u
588u
588u

FIG. 112

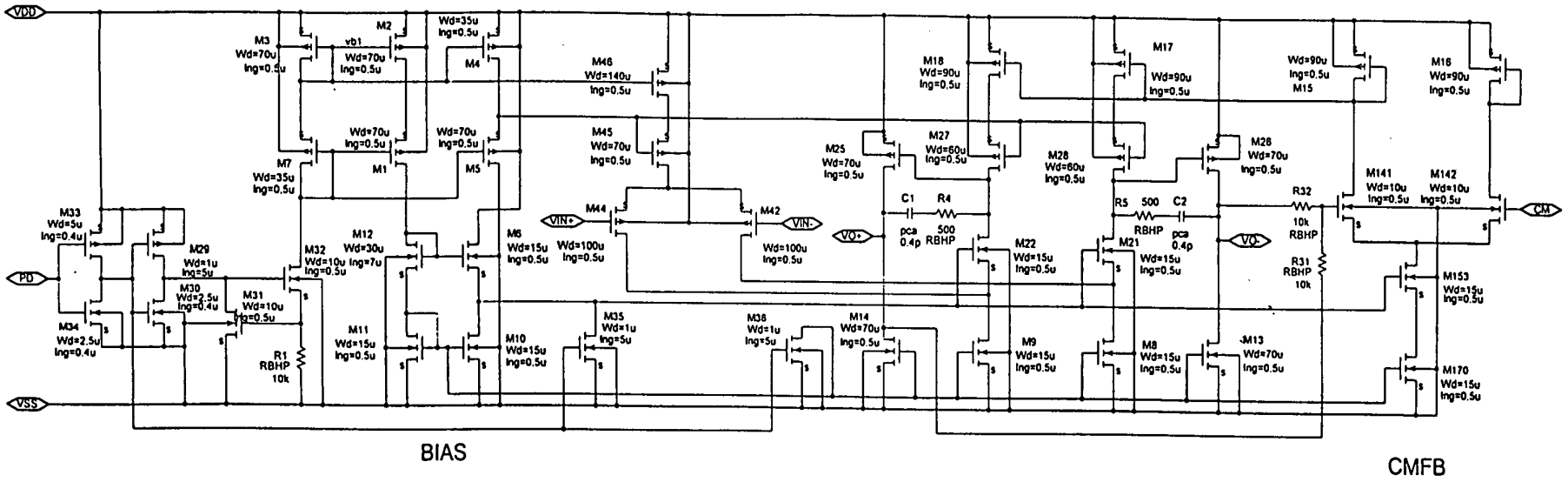

VDD
VSS
PD
VIN+
VIN-
VO+
VO-
CM
M1
M2
M3
M4
M5
M6
M7
M8
M9
M10
M11
M12
M13
M14
M15
M16
M17
M18
M21
M22
M25
M26
M27
M28
M29
M30
M31
M32
M33
M34
M35
M38
M42
M44
M45
M46
M141
M142
M153
M170
vb1
C1
C2
R1
R4
R5
R31
R32
RBHP
10k
500
0.4p
BIAS
CMFB

FIG. 113

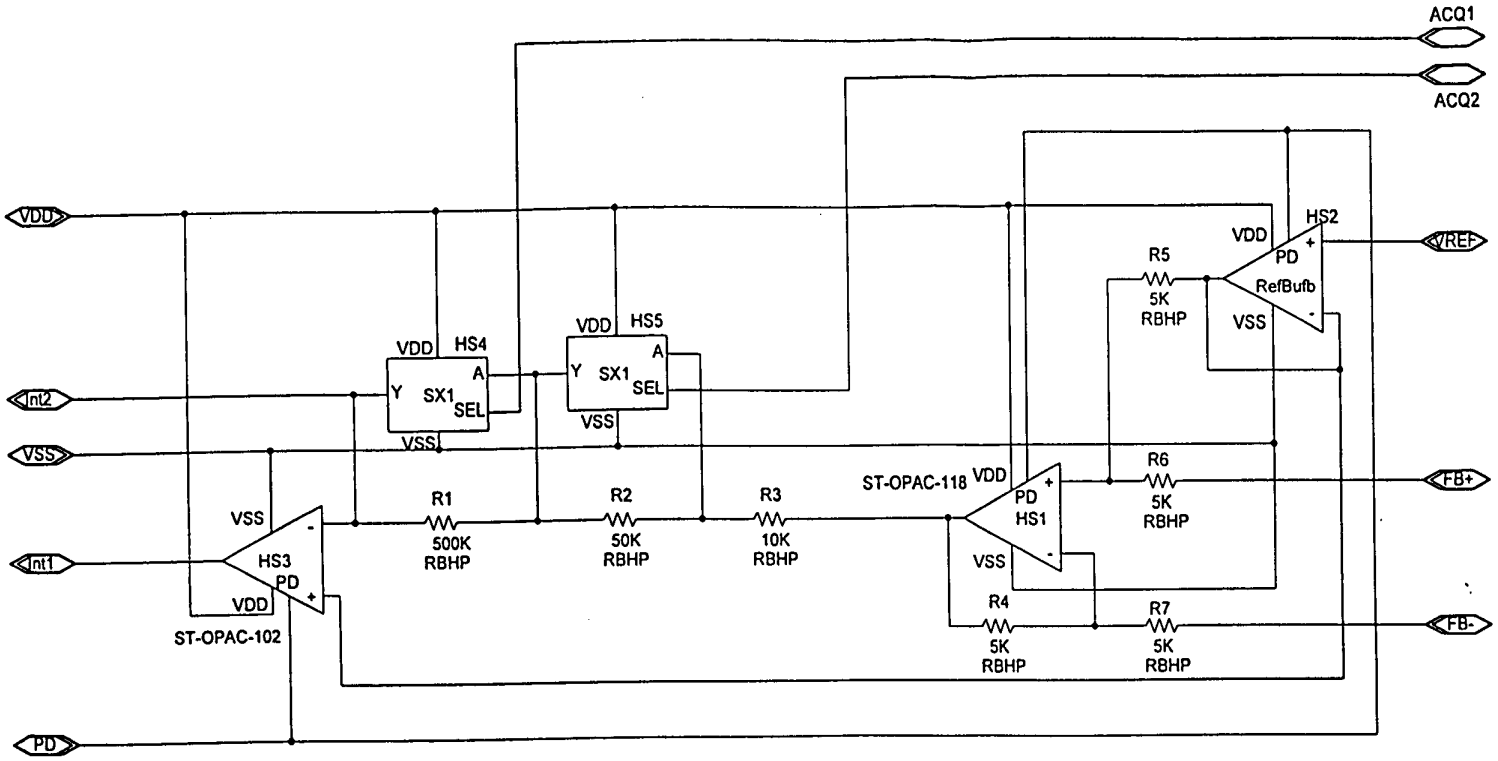

ACQ1
ACQ2
VDD
Int2
VSS
Int1
PD
VREF
FB+
FB-
HS4
HS5
HS2
HS3
HS1
SX1
A
Y
SEL
PD
RefBufb
R1
500K
RBHP
R2
50K
RBHP
R3
10K
RBHP
R4
5K
RBHP
R5
5K
RBHP
R6
5K
RBHP
R7
5K
RBHP
ST-OPAC-102
ST-OPAC-118

FIG. 114

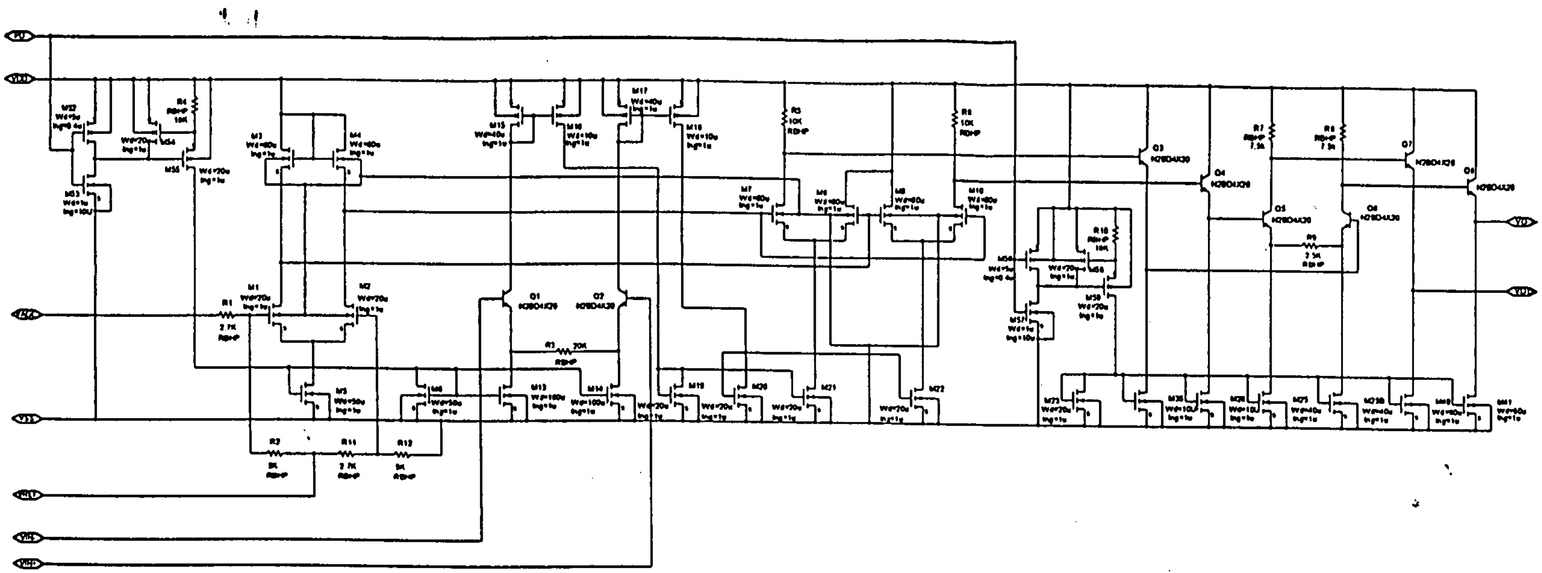


FIG. 115

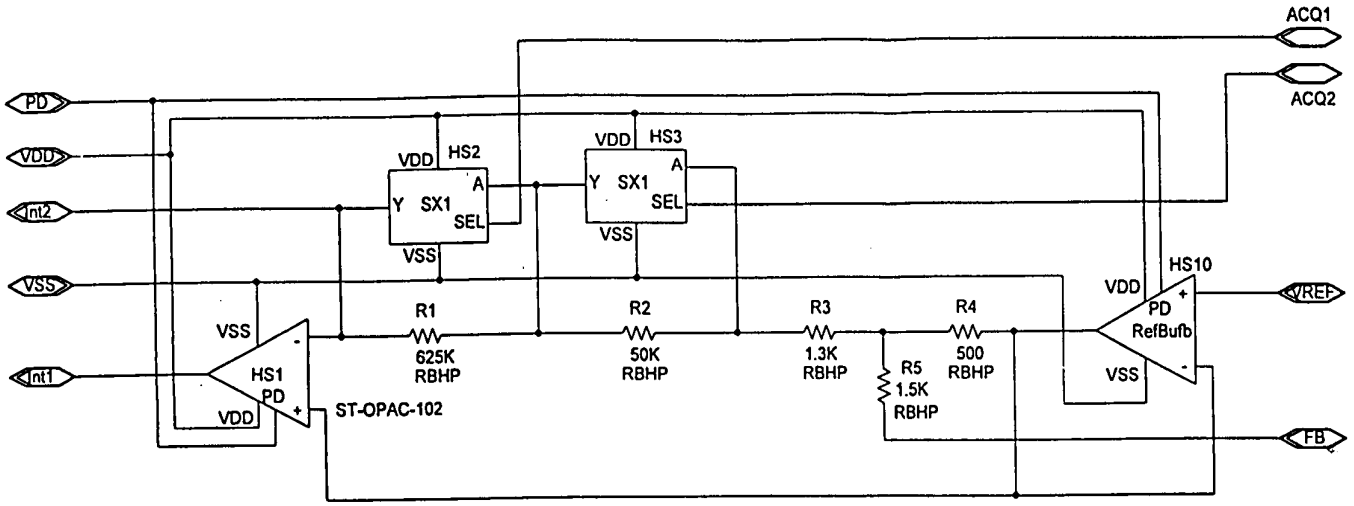

ACQ1
ACQ2
PD
VDD
Int2
VSS
Int1
VDD
HS2
Y SX1
A
SEL
VSS
VDD
HS3
Y SX1
A
SEL
VSS
VSS
HS1
PD
VDD
ST-OPAC-102
R1
625K
RBHP
R2
50K
RBHP
R3
1.3K
RBHP
R4
500
RBHP
R5
1.5K
RBHP
VDD
HS10
PD
RefBufb
VSS
VREF
FB

FIG. 116

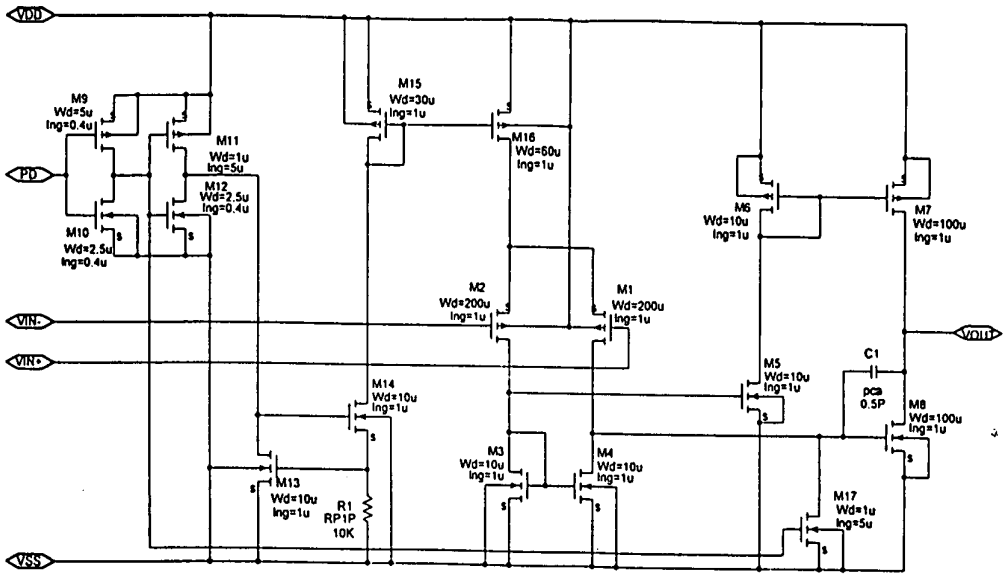

VDD
PD
VIN-
VIN+
VSS
VOUT
M9
Wd=5u
lng=0.4u
M11
Wd=1u
lng=5u
M12
Wd=2.5u
lng=0.4u
M10
Wd=2.5u
lng=0.4u
M15
Wd=30u
lng=1u
M16
Wd=60u
lng=1u
M6
Wd=10u
lng=1u
M7
Wd=100u
lng=1u
M2
Wd=200u
lng=1u
M1
Wd=200u
lng=1u
M5
Wd=10u
lng=1u
C1
pca
0.5P
M8
Wd=100u
lng=1u
M14
Wd=10u
lng=1u
M13
Wd=10u
lng=1u
R1
RP1P
10K
M3
Wd=10u
lng=1u
M4
Wd=10u
lng=1u
M17
Wd=1u
lng=5u

FIG. 117

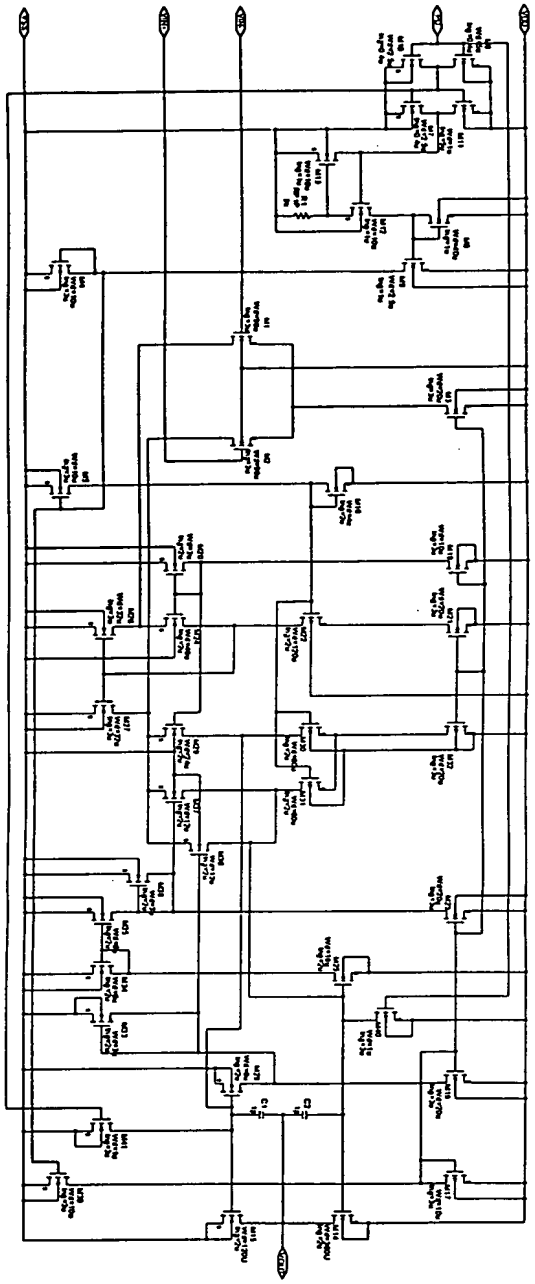


Fig 11B

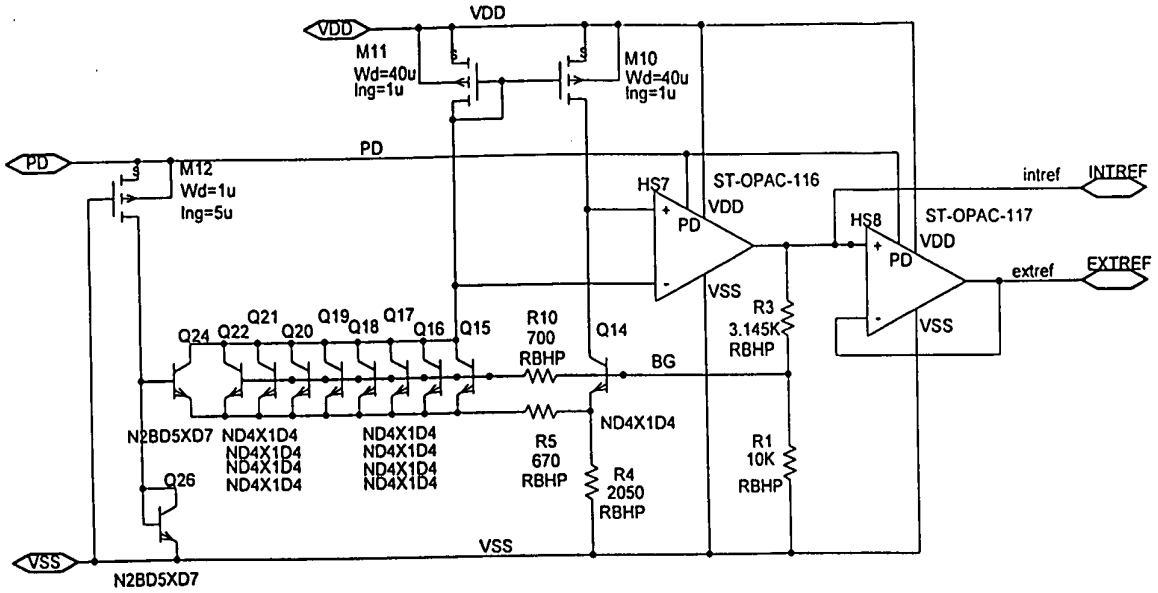

VDD
VDD
M11
Wd=40u
lng=1u
M10
Wd=40u
lng=1u
PD
PD
M12
Wd=1u
lng=5u
HS7
ST-OPAC-116
VDD
PD
VSS
HS8
ST-OPAC-117
VDD
PD
VSS
intref
INTREF
extref
EXTREF
R3
3.145K
RBHP
Q24 Q22 Q21 Q20 Q19 Q18 Q17 Q16 Q15
R10
700
RBHP
Q14
BG
N2BD5XD7 ND4X1D4
ND4X1D4
ND4X1D4
ND4X1D4
ND4X1D4
ND4X1D4
ND4X1D4
ND4X1D4
R5
670
RBHP
ND4X1D4
R4
2050
RBHP
R1
10K
RBHP
Q26
VSS
VSS
N2BD5XD7

FIG. 119

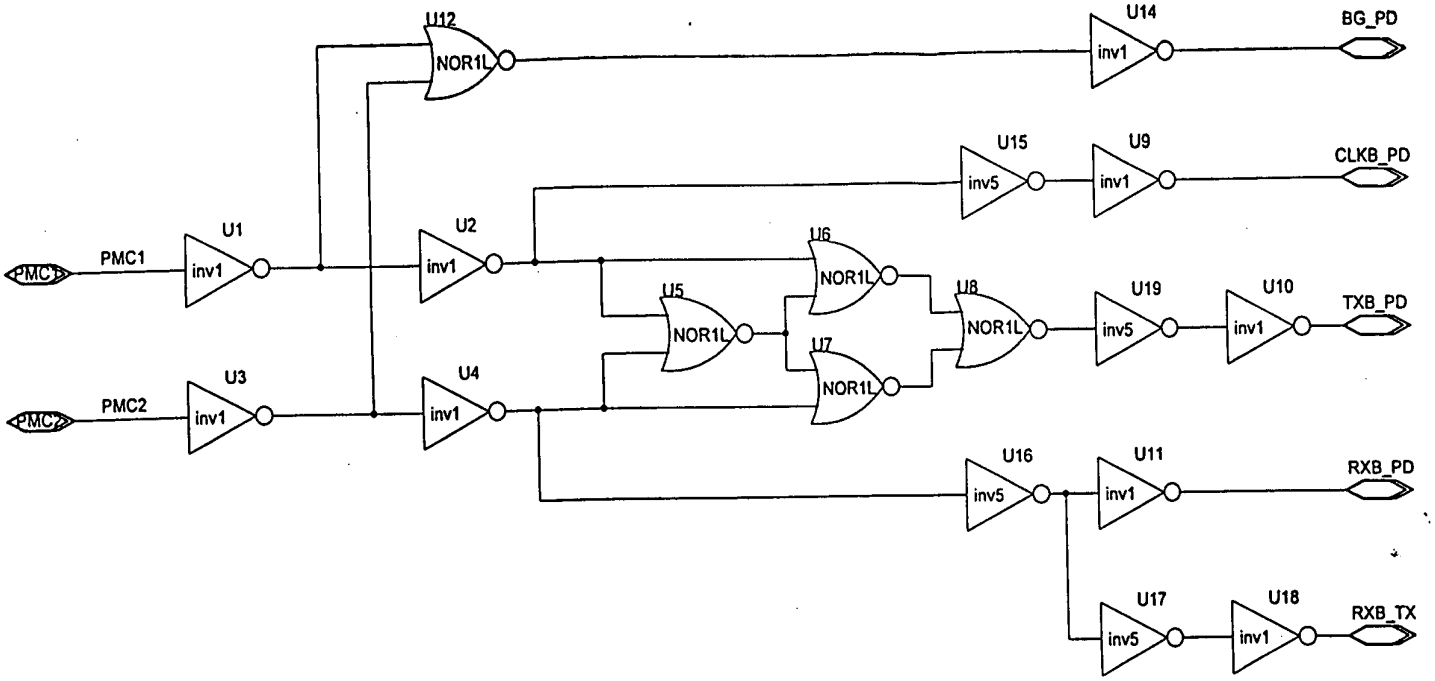

PMC1
PMC2
U1
inv1
U2
inv1
U3
inv1
U4
inv1
U5
NOR1L
U6
NOR1L
U7
NOR1L
U8
NOR1L
U9
inv1
U10
inv1
U11
inv1
U12
NOR1L
U14
inv1
U15
inv5
U16
inv5
U17
inv5
U18
inv1
U19
inv5
BG_PD
CLKB_PD
TXB_PD
RXB_PD
RXB_TX

FIG. 120

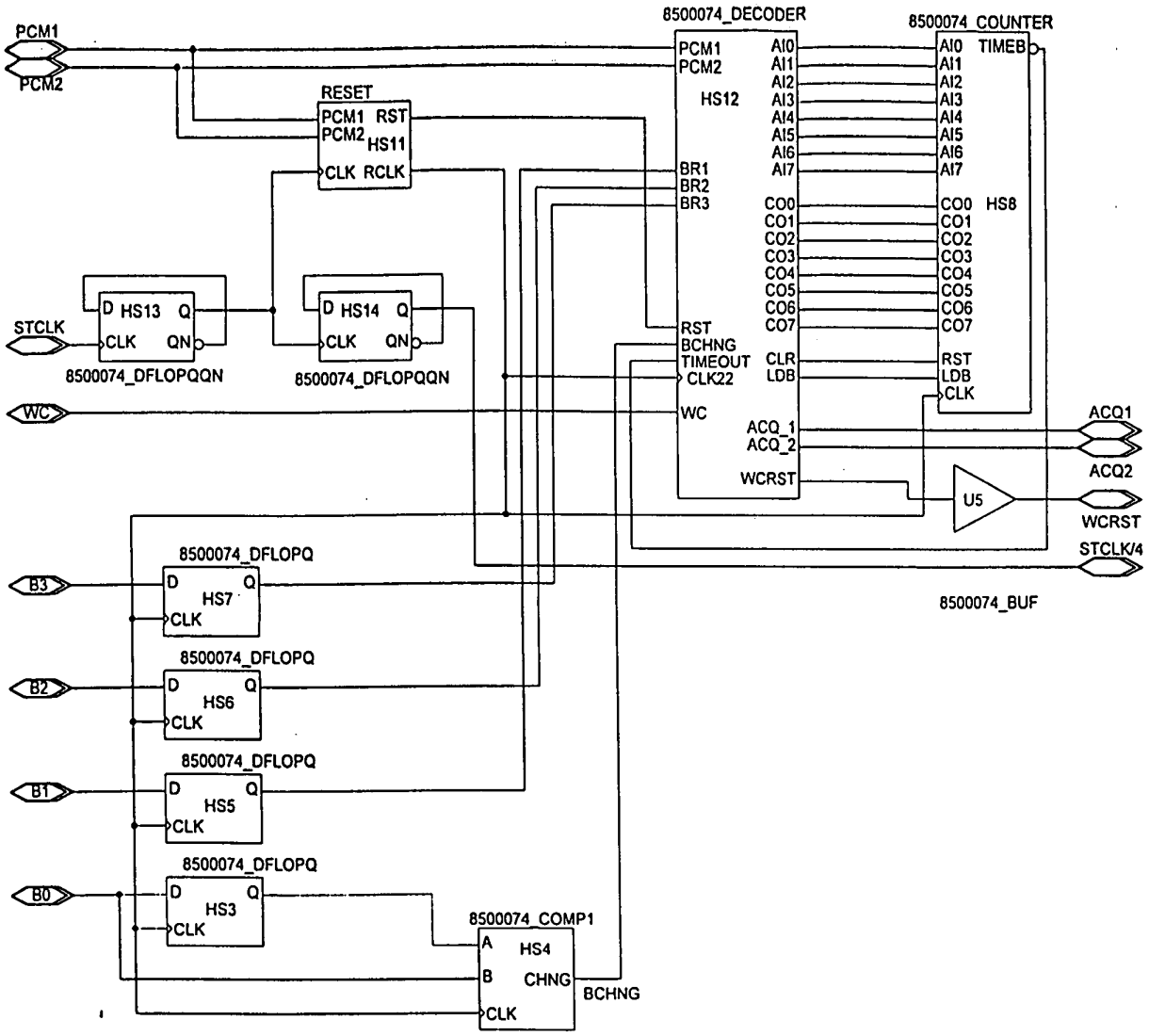


FIG. 12I

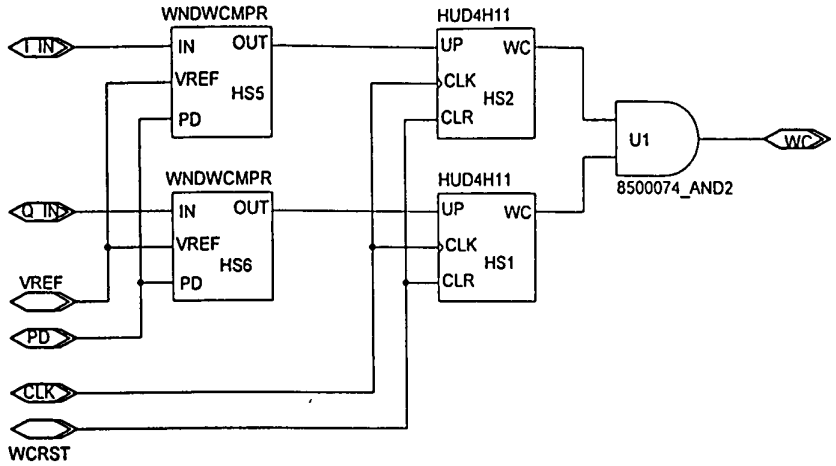

WNDWCMPR
I_IN
IN
OUT
VREF
HS5
PD
HUD4H11
UP
WC
CLK
HS2
CLR
U1
WC
8500074_AND2
WNDWCMPR
Q_IN
IN
OUT
VREF
HS6
PD
HUD4H11
UP
WC
CLK
HS1
CLR
VREF
PD
CLK
WCRST

FIG. 122

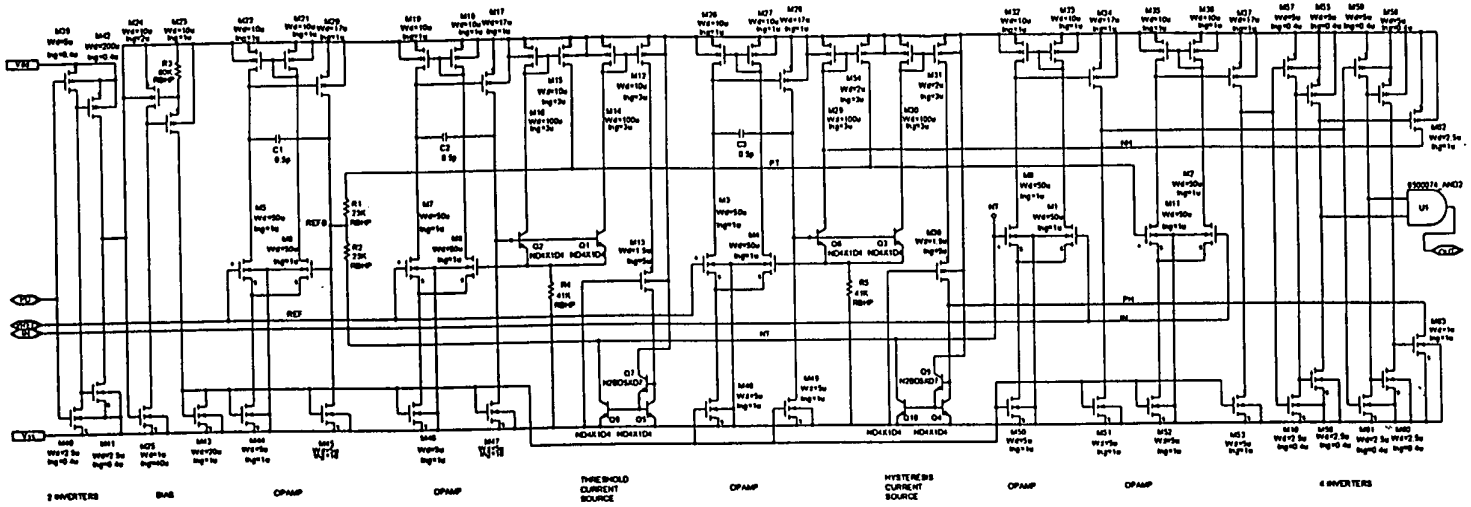

2 INVERTERS
BIAS
OPAMP
OPAMP
THRESHOLD CURRENT SOURCE
OPAMP
HYSTERESIS CURRENT SOURCE
OPAMP
OPAMP
4 INVERTERS

FIG. 123

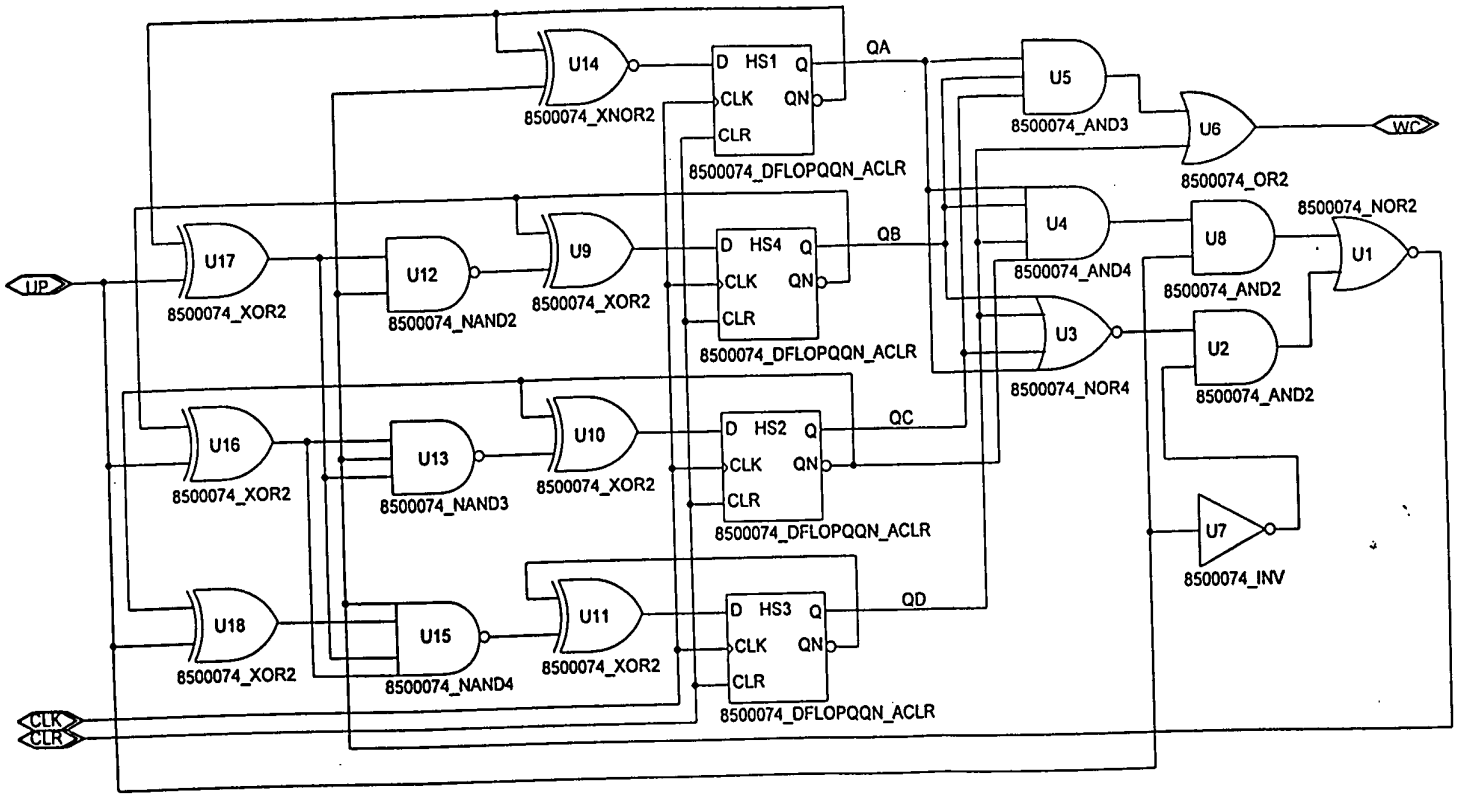

U14
8500074_XNOR2
D HS1 Q
CLK QN
CLR
8500074_DFLOPQQN_ACLR
QA
U5
8500074_AND3
U6
8500074_OR2
WC
UP
U17
8500074_XOR2
U12
8500074_NAND2
U9
8500074_XOR2
D HS4 Q
CLK QN
CLR
8500074_DFLOPQQN_ACLR
QB
U4
8500074_AND4
U8
8500074_AND2
8500074_NOR2
U1
U3
8500074_NOR4
U2
8500074_AND2
U16
8500074_XOR2
U13
8500074_NAND3
U10
8500074_XOR2
D HS2 Q
CLK QN
CLR
8500074_DFLOPQQN_ACLR
QC
U7
8500074_INV
U18
8500074_XOR2
U15
8500074_NAND4
U11
8500074_XOR2
D HS3 Q
CLK QN
CLR
8500074_DFLOPQQN_ACLR
QD
CLK
CLR

FIG. 12A

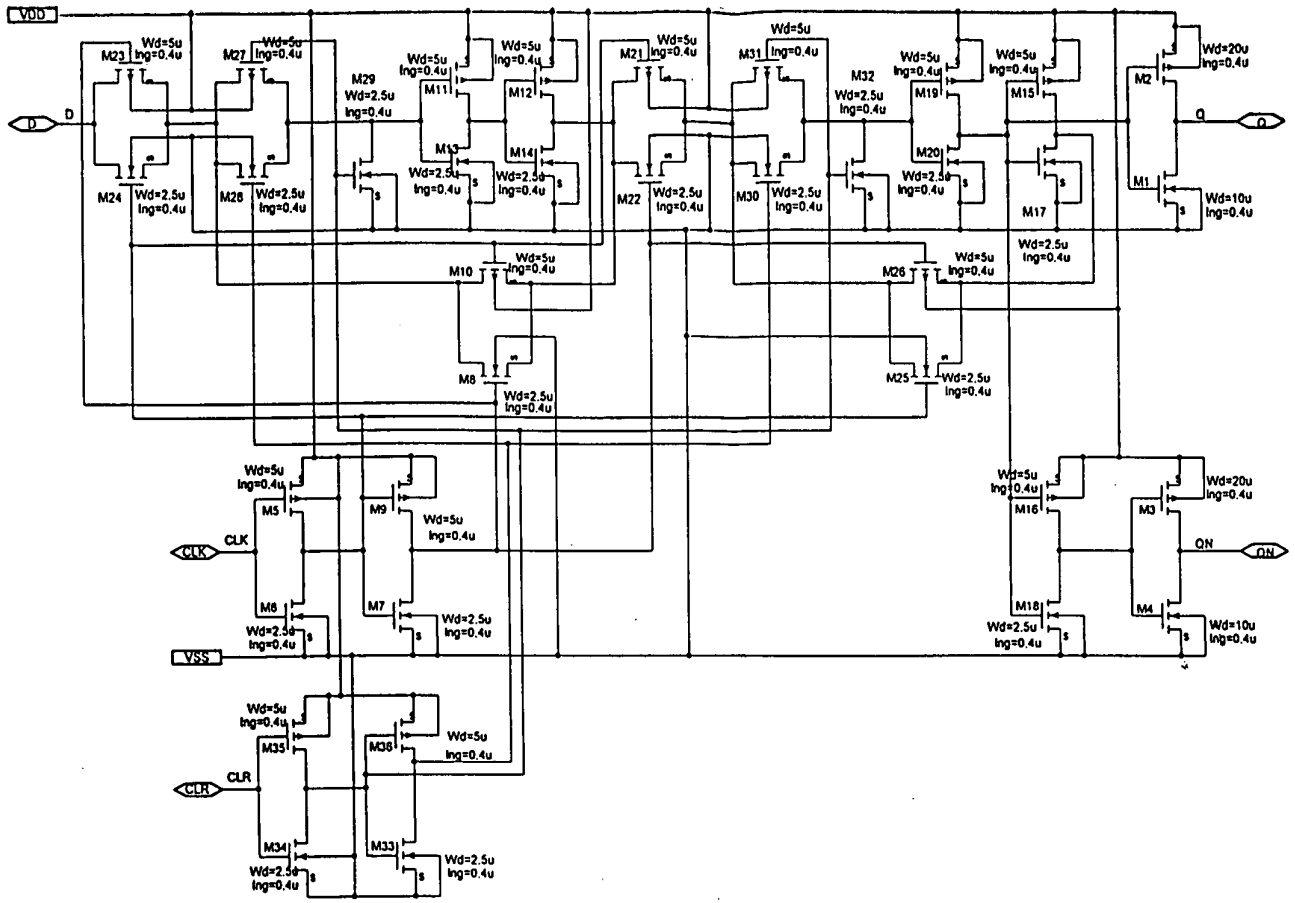

VDD
D
Q
QN
CLK
VSS
CLR
M1
M2
M3
M4
M5
M6
M7
M8
M9
M10
M11
M12
M13
M14
M15
M16
M17
M18
M19
M20
M21
M22
M23
M24
M25
M26
M27
M28
M29
M30
M31
M32
M33
M34
M35
M36
Wd=5u lng=0.4u
Wd=2.5u lng=0.4u
Wd=20u lng=0.4u
Wd=10u lng=0.4u

FIG. 12S

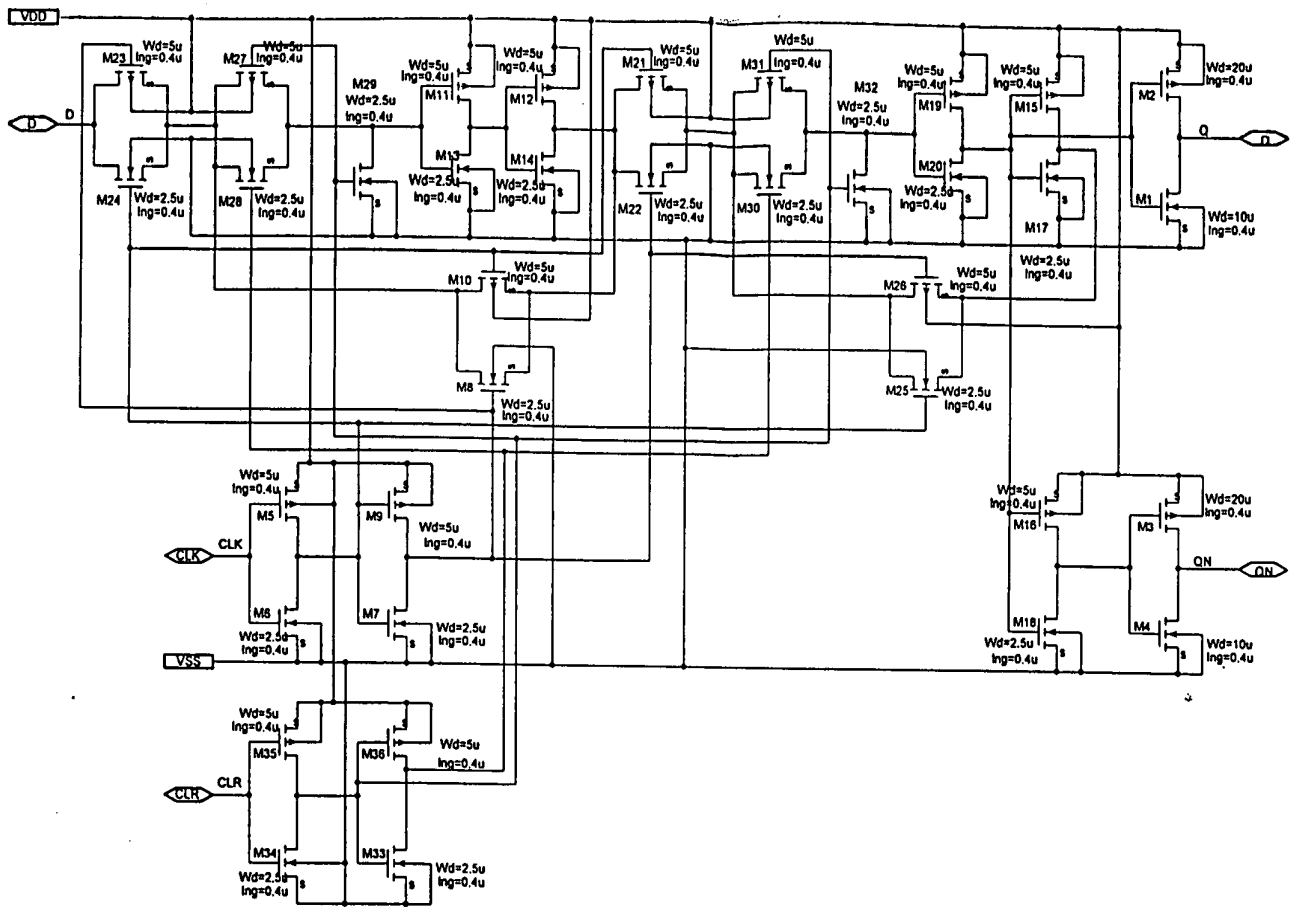

VDD
D
M23
M27
M24
M28
M29
M11
M12
M13
M14
M21
M22
M31
M30
M32
M19
M20
M15
M17
M2
M1
Q
QN
M10
M8
M26
M25
CLK
M5
M9
M6
M7
VSS
M16
M3
M18
M4
CLR
M35
M36
M34
M33
Wd=5u
lng=0.4u
Wd=2.5u
lng=0.4u
Wd=20u
lng=0.4u
Wd=10u
lng=0.4u

FIG 126

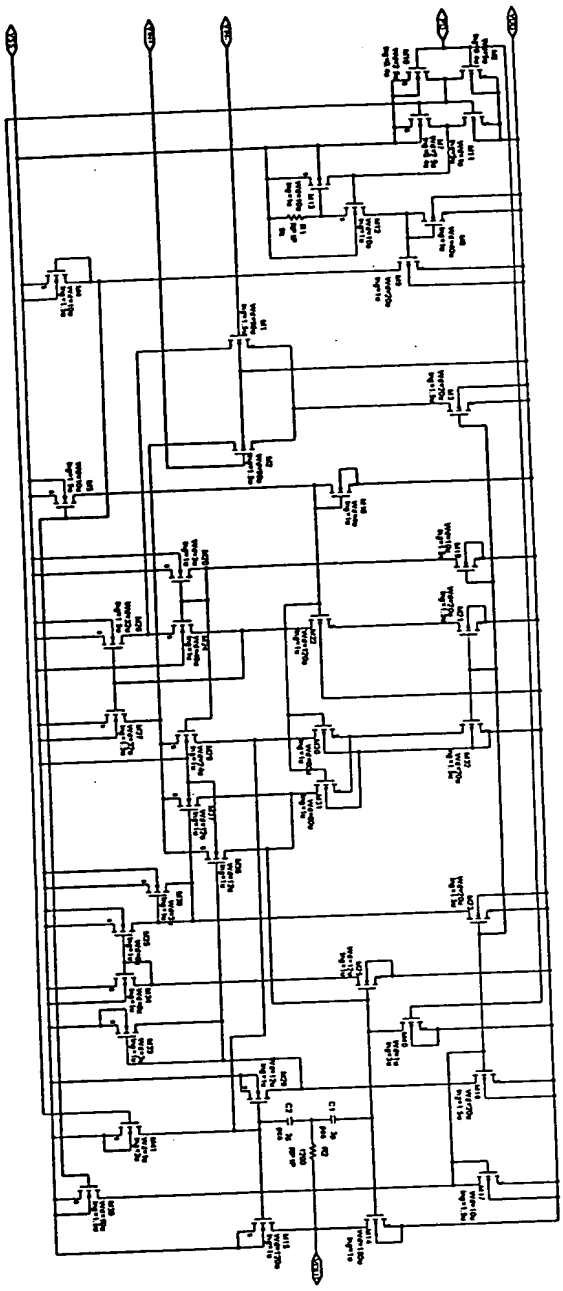


FIG. 12I

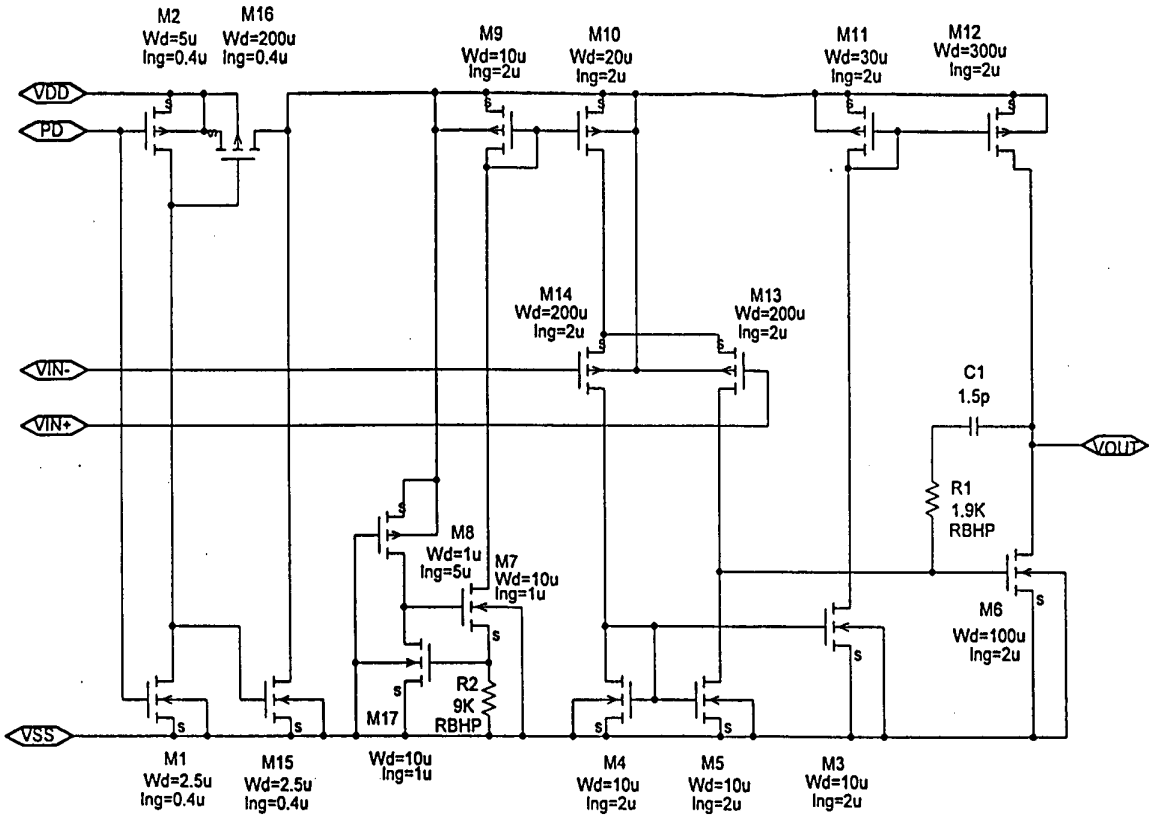

M2
Wd=5u
lng=0.4u
M16
Wd=200u
lng=0.4u
M9
Wd=10u
lng=2u
M10
Wd=20u
lng=2u
M11
Wd=30u
lng=2u
M12
Wd=300u
lng=2u
VDD
PD
M14
Wd=200u
lng=2u
M13
Wd=200u
lng=2u
VIN-
VIN+
C1
1.5p
VOUT
R1
1.9K
RBHP
M8
Wd=1u
lng=5u
M7
Wd=10u
lng=1u
M6
Wd=100u
lng=2u
R2
9K
RBHP
M17
VSS
M1
Wd=2.5u
lng=0.4u
M15
Wd=2.5u
lng=0.4u
Wd=10u
lng=1u
M4
Wd=10u
lng=2u
M5
Wd=10u
lng=2u
M3
Wd=10u
lng=2u

FIG. 12B

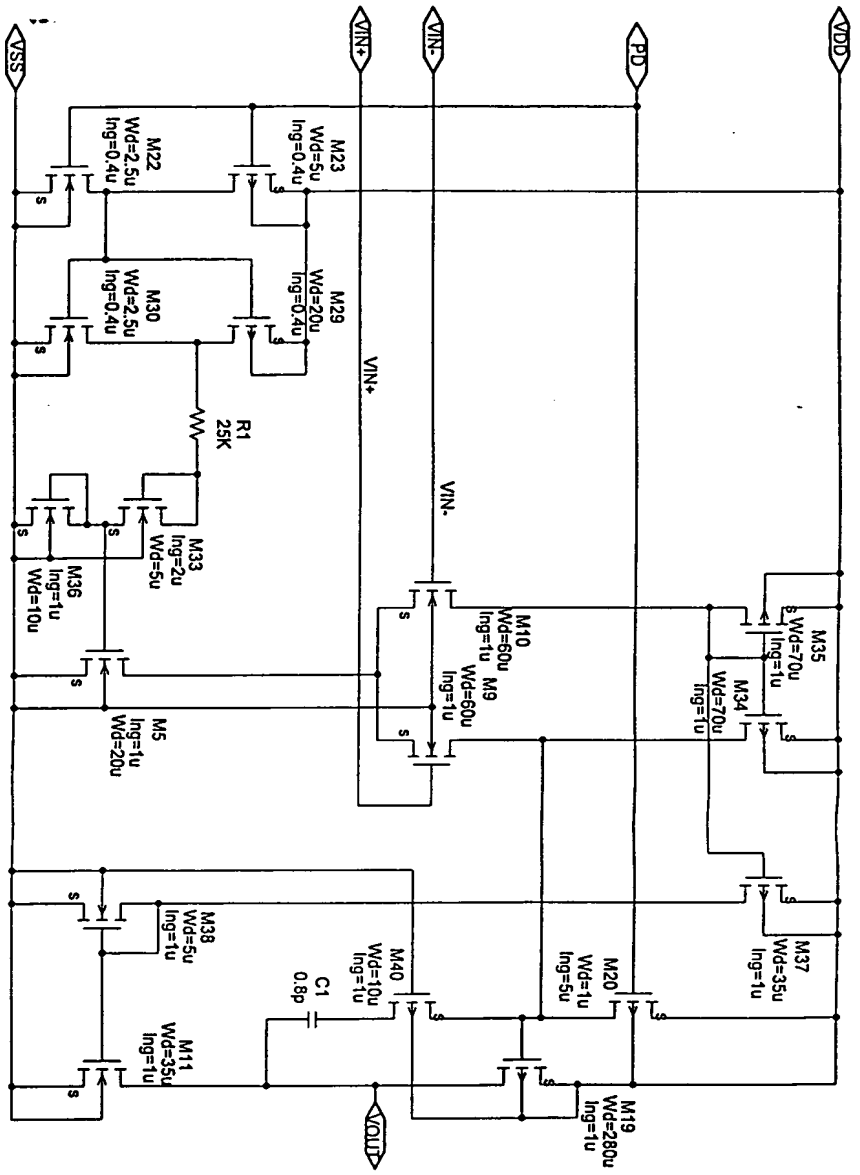

VSS
VIN+
VIN-
PD
VDD
M22
Wd=2.5u
lng=0.4u
M23
Wd=5u
lng=0.4u
M30
Wd=2.5u
lng=0.4u
M29
Wd=20u
lng=0.4u
R1
25K
M33
lng=2u
Wd=5u
M36
lng=1u
Wd=10u
M5
lng=1u
Wd=20u
M10
Wd=60u
lng=1u
M9
Wd=60u
lng=1u
M35
Wd=70u
lng=1u
M34
Wd=70u
lng=1u
M38
Wd=5u
lng=1u
M40
Wd=10u
lng=1u
C1
0.8p
M11
Wd=35u
lng=1u
M20
Wd=1u
lng=5u
M37
Wd=35u
lng=1u
M19
Wd=280u
lng=1u
VOUT

FIG. 12g

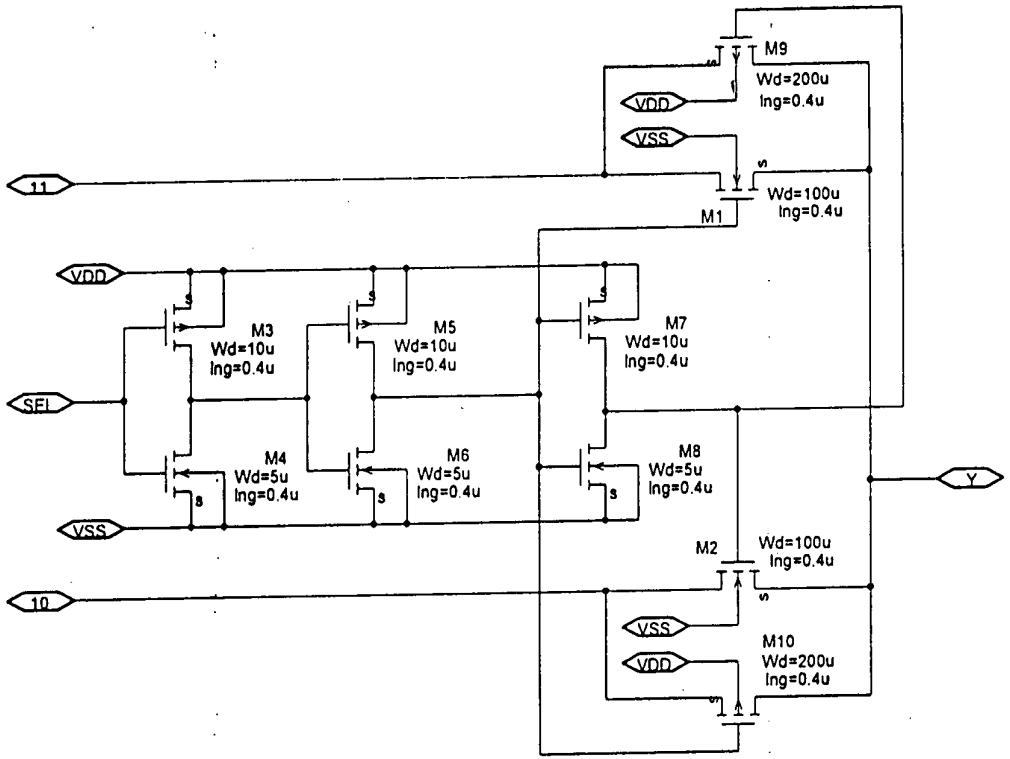

M9
Wd=200u
lng=0.4u
VDD
VSS
11
Wd=100u
lng=0.4u
M1
VDD
M3
Wd=10u
lng=0.4u
M5
Wd=10u
lng=0.4u
M7
Wd=10u
lng=0.4u
SEL
M4
Wd=5u
lng=0.4u
M6
Wd=5u
lng=0.4u
M8
Wd=5u
lng=0.4u
Y
VSS
M2
Wd=100u
lng=0.4u
10
VSS
M10
Wd=200u
lng=0.4u
VDD

FIG 130

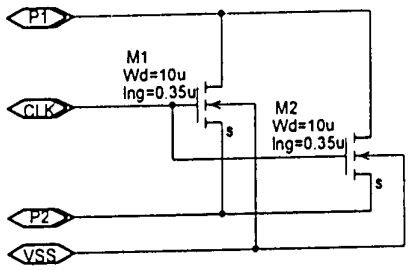


Fig. 13J

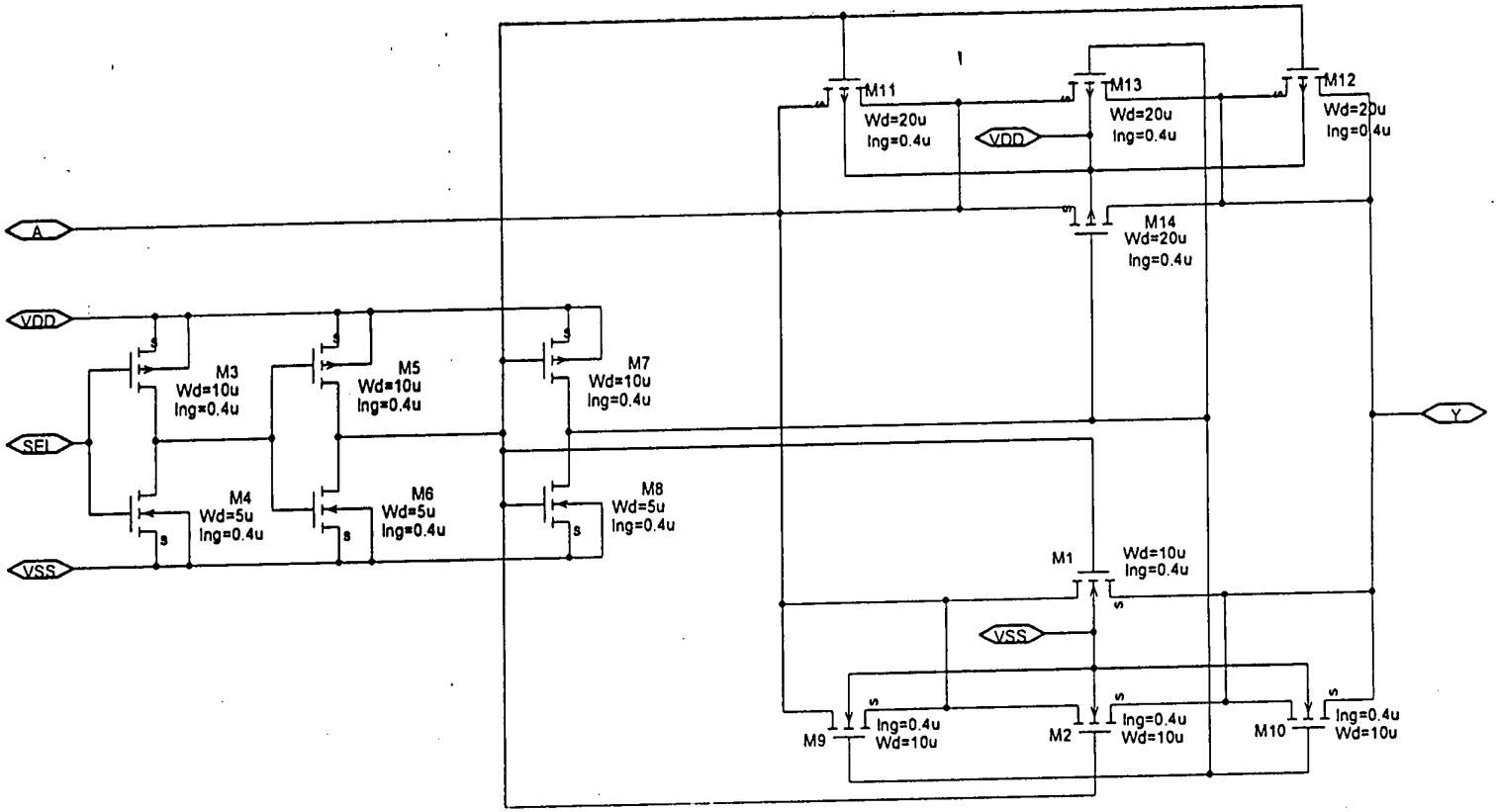

A
VDD
SEL
VSS
Y
M1
Wd=10u
lng=0.4u
M2
lng=0.4u
Wd=10u
M3
Wd=10u
lng=0.4u
M4
Wd=5u
lng=0.4u
M5
Wd=10u
lng=0.4u
M6
Wd=5u
lng=0.4u
M7
Wd=10u
lng=0.4u
M8
Wd=5u
lng=0.4u
M9
lng=0.4u
Wd=10u
M10
lng=0.4u
Wd=10u
M11
Wd=20u
lng=0.4u
M12
Wd=20u
lng=0.4u
M13
Wd=20u
lng=0.4u
M14
Wd=20u
lng=0.4u

FIG. 132

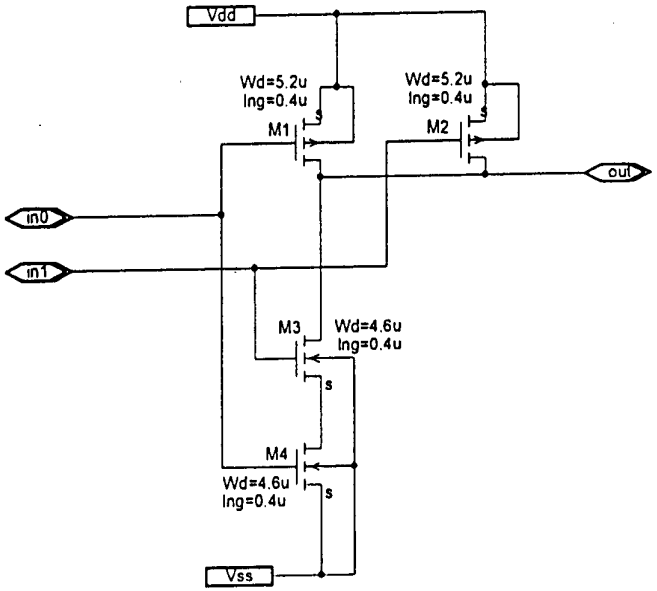

Vdd
Wd=5.2u
lng=0.4u
M1
s
Wd=5.2u
lng=0.4u
M2
s
out
in0
in1
M3
Wd=4.6u
lng=0.4u
s
M4
Wd=4.6u
lng=0.4u
s
Vss

FIG. 133

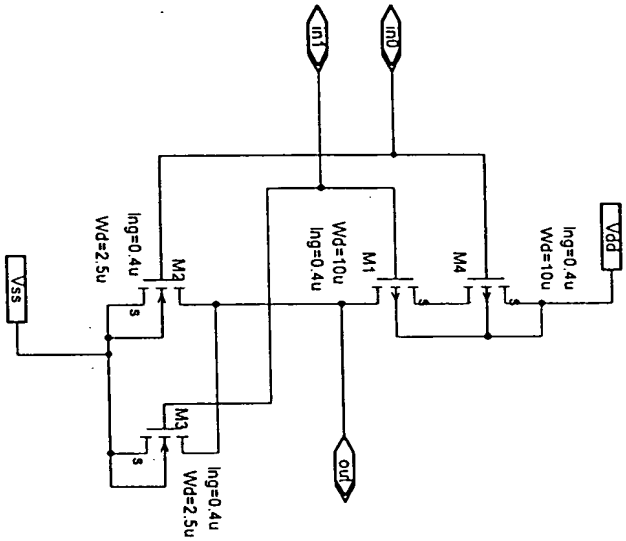

in1
in0
Vdd
Vss
M1
M2
M3
M4
Wd=10u
lng=0.4u
lng=0.4u
Wd=2.5u
lng=0.4u
Wd=10u
lng=0.4u
Wd=2.5u
out
s
s

FIG. 13A

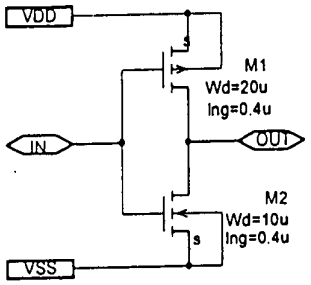


FIG. 135

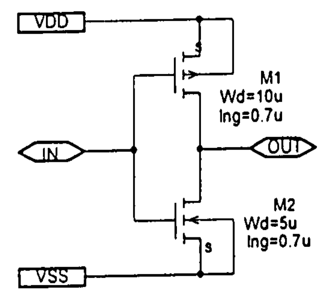


FIG. 136

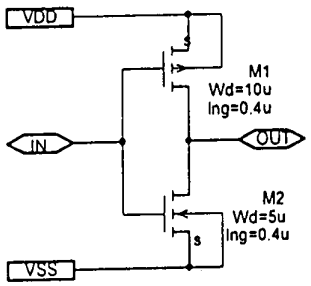


FIG 137

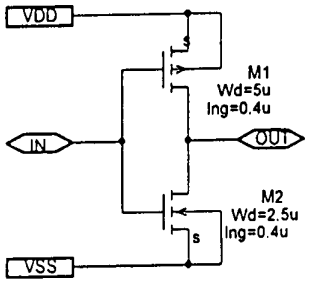


FIG. 13E

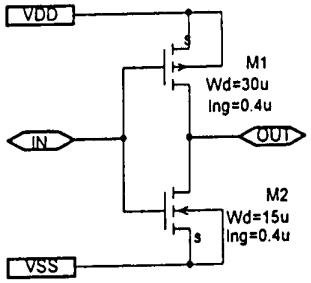


FIG. 139

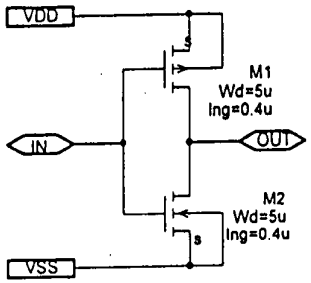


FIG. 14D

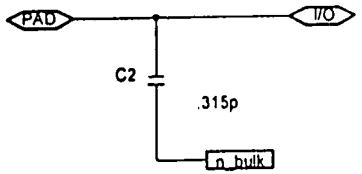


FIG. 141

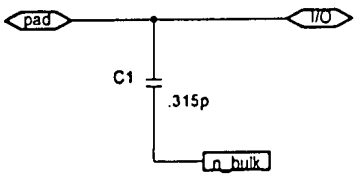


FIG. 142

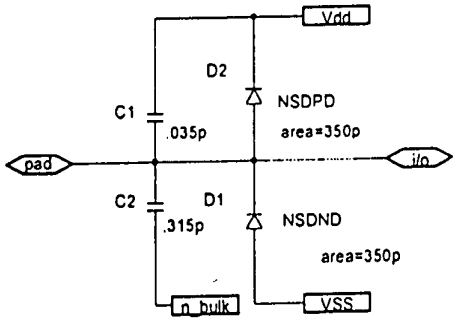

Vdd
D2
NSDPD
C1
.035p
area=350p
pad
i/o
C2
D1
.315p
NSDND
area=350p
n_bulk
VSS

FIG 143

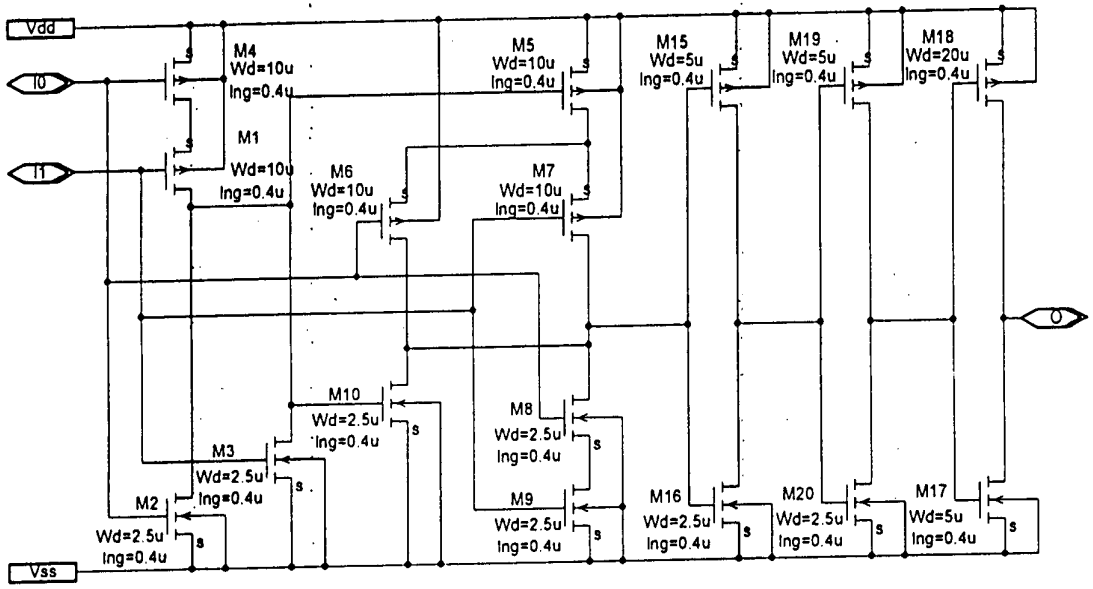

Vdd
I0
I1
Vss
O
M1
Wd=10u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M3
Wd=2.5u
lng=0.4u
M4
Wd=10u
lng=0.4u
M5
Wd=10u
lng=0.4u
M6
Wd=10u
lng=0.4u
M7
Wd=10u
lng=0.4u
M8
Wd=2.5u
lng=0.4u
M9
Wd=2.5u
lng=0.4u
M10
Wd=2.5u
lng=0.4u
M15
Wd=5u
lng=0.4u
M16
Wd=2.5u
lng=0.4u
M17
Wd=5u
lng=0.4u
M18
Wd=20u
lng=0.4u
M19
Wd=5u
lng=0.4u
M20
Wd=2.5u
lng=0.4u

Fig 144

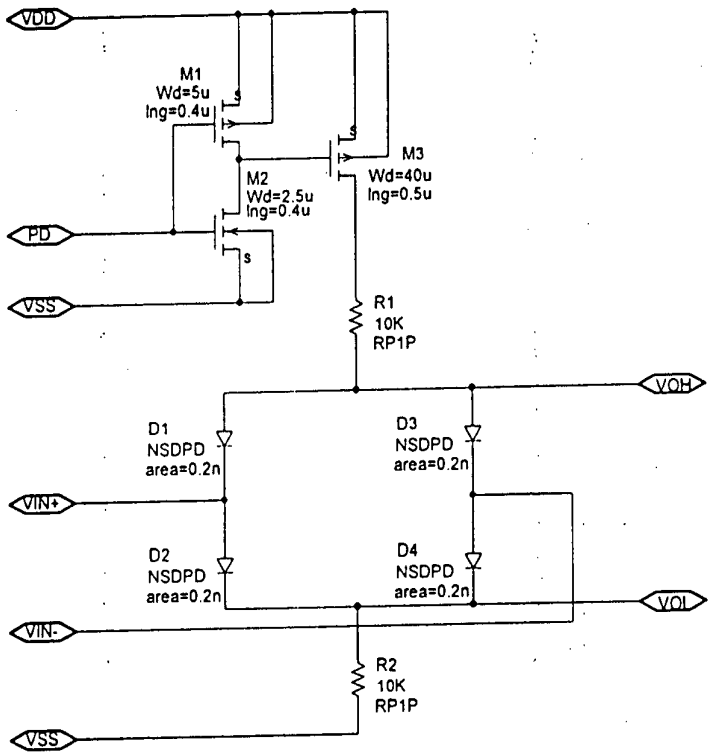

VDD
M1
Wd=5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M3
Wd=40u
lng=0.5u
PD
VSS
R1
10K
RP1P
VOH
D1
NSDPD
area=0.2n
D3
NSDPD
area=0.2n
VIN+
D2
NSDPD
area=0.2n
D4
NSDPD
area=0.2n
VOL
VIN-
R2
10K
RP1P
VSS

FIG. 145

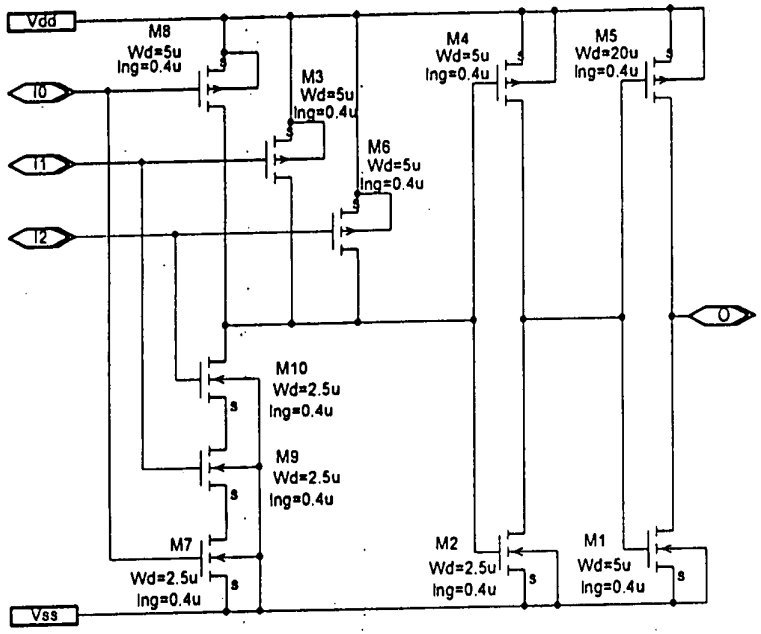

Vdd
M8
Wd=5u
lng=0.4u
I0
I1
I2
M3
Wd=5u
lng=0.4u
M6
Wd=5u
lng=0.4u
M4
Wd=5u
lng=0.4u
M5
Wd=20u
lng=0.4u
O
M10
Wd=2.5u
lng=0.4u
M9
Wd=2.5u
lng=0.4u
M7
Wd=2.5u
lng=0.4u
Vss
M2
Wd=2.5u
lng=0.4u
M1
Wd=5u
lng=0.4u

FIG. 14b

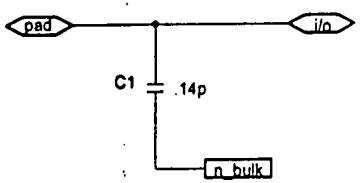


FIG. 147

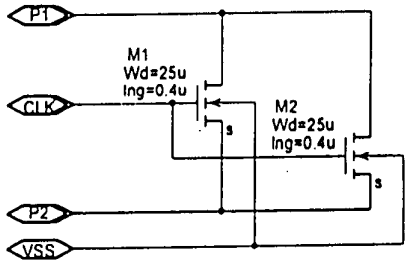


FIG. 148

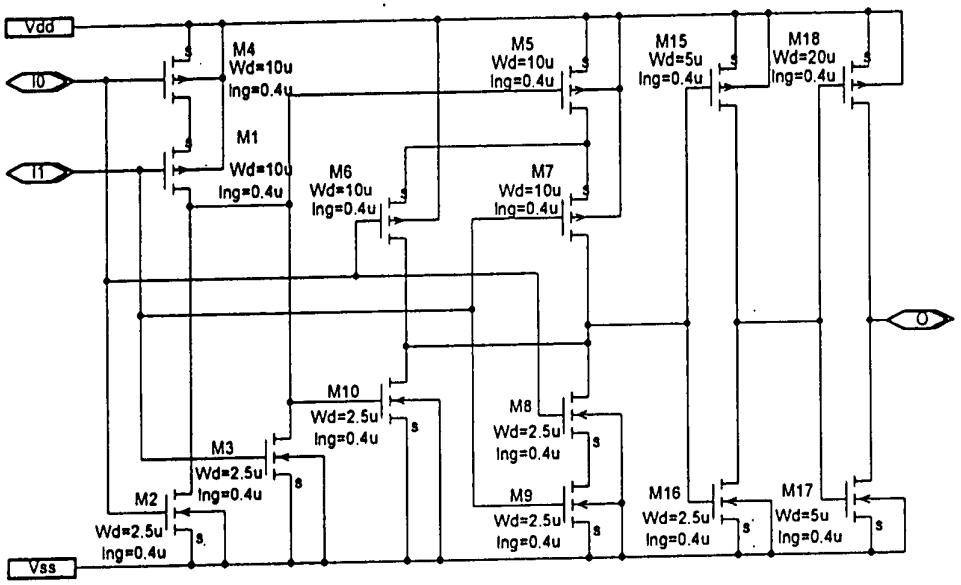

Vdd
I0
I1
Vss
O
M4
Wd=10u
lng=0.4u
M1
Wd=10u
lng=0.4u
M5
Wd=10u
lng=0.4u
M6
Wd=10u
lng=0.4u
M7
Wd=10u
lng=0.4u
M15
Wd=5u
lng=0.4u
M18
Wd=20u
lng=0.4u
M10
Wd=2.5u
lng=0.4u
M3
Wd=2.5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M8
Wd=2.5u
lng=0.4u
M9
Wd=2.5u
lng=0.4u
M16
Wd=2.5u
lng=0.4u
M17
Wd=5u
lng=0.4u

FIG. 149

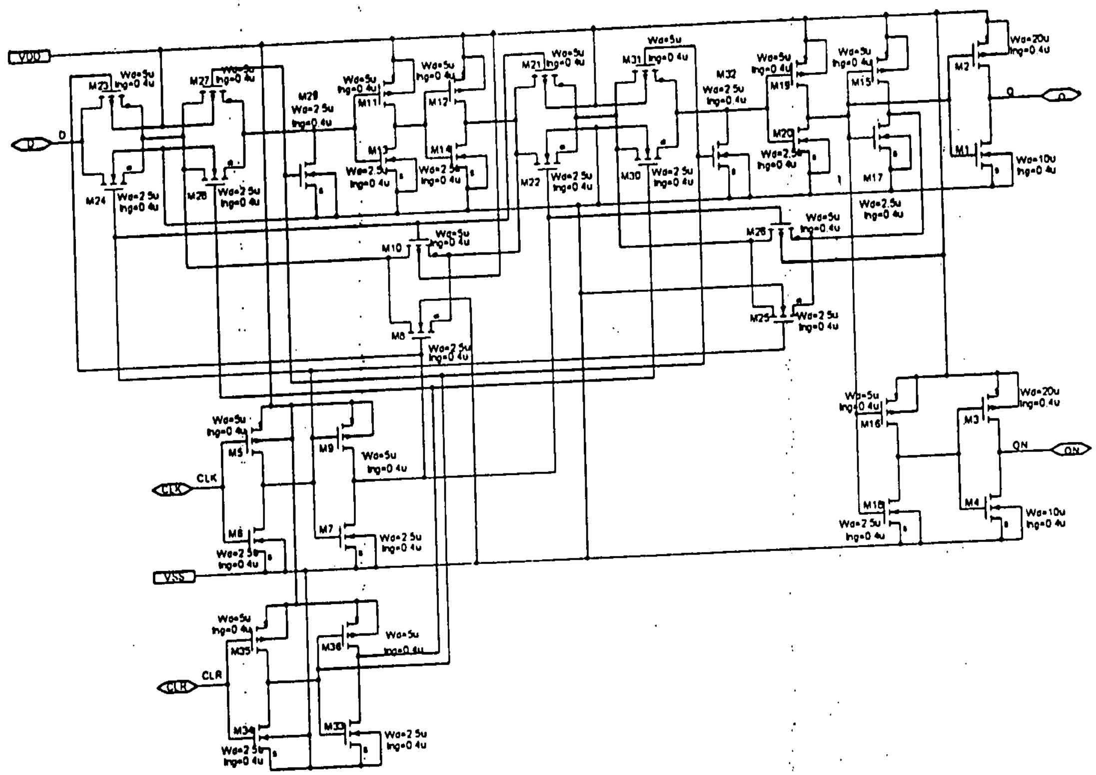


FIG. 150

09632856 .080400

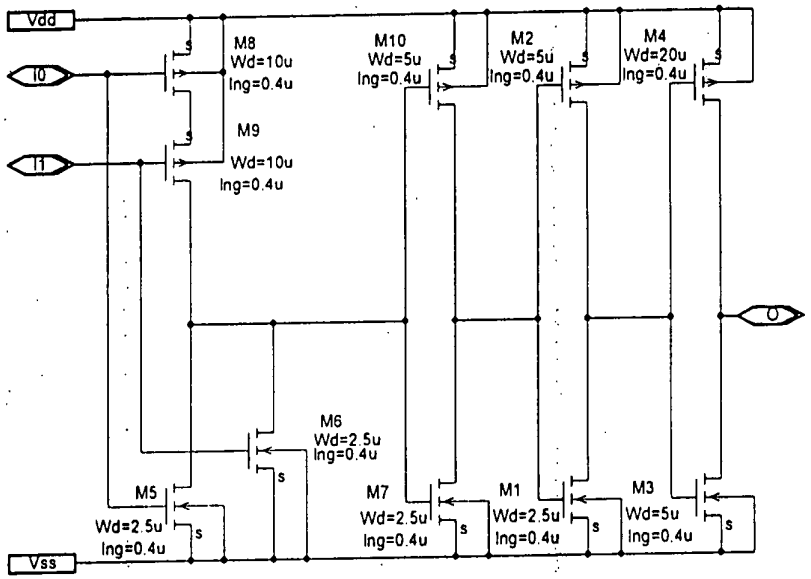

Vdd
I0
I1
Vss
O
M8
Wd=10u
lng=0.4u
M9
Wd=10u
lng=0.4u
M10
Wd=5u
lng=0.4u
M2
Wd=5u
lng=0.4u
M4
Wd=20u
lng=0.4u
M6
Wd=2.5u
lng=0.4u
M5
Wd=2.5u
lng=0.4u
M7
Wd=2.5u
lng=0.4u
M1
Wd=2.5u
lng=0.4u
M3
Wd=5u
lng=0.4u

FIG. 15I

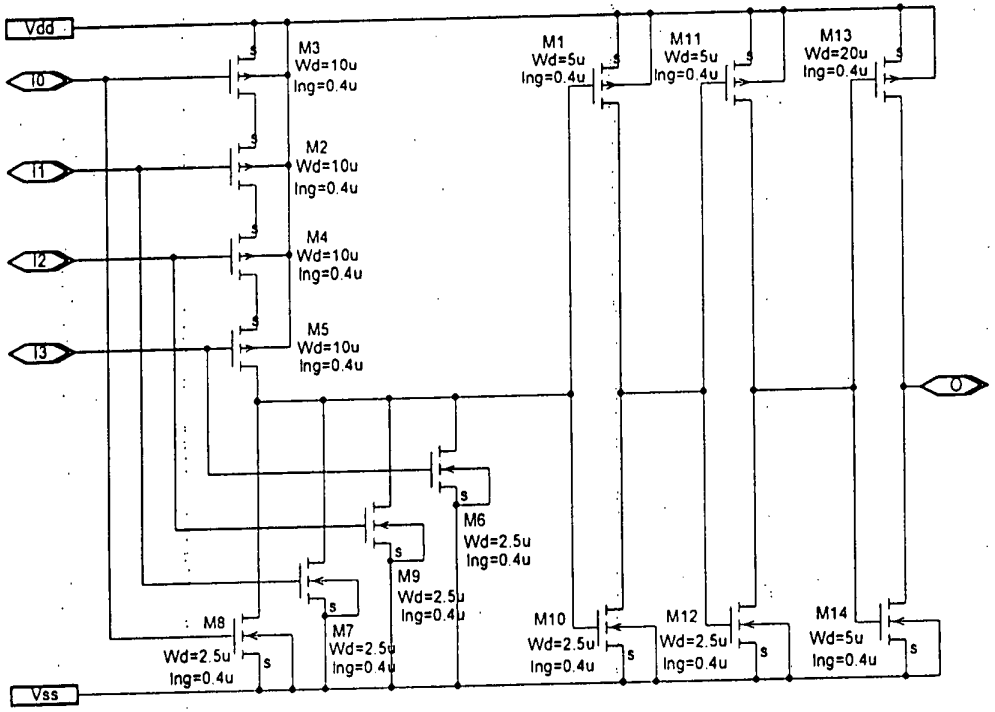

Vdd
I0
I1
I2
I3
Vss
O
M1
Wd=5u
lng=0.4u
M2
Wd=10u
lng=0.4u
M3
Wd=10u
lng=0.4u
M4
Wd=10u
lng=0.4u
M5
Wd=10u
lng=0.4u
M6
Wd=2.5u
lng=0.4u
M7
Wd=2.5u
lng=0.4u
M8
Wd=2.5u
lng=0.4u
M9
Wd=2.5u
lng=0.4u
M10
Wd=2.5u
lng=0.4u
M11
Wd=5u
lng=0.4u
M12
Wd=2.5u
lng=0.4u
M13
Wd=20u
lng=0.4u
M14
Wd=5u
lng=0.4u
s

FIG. 152

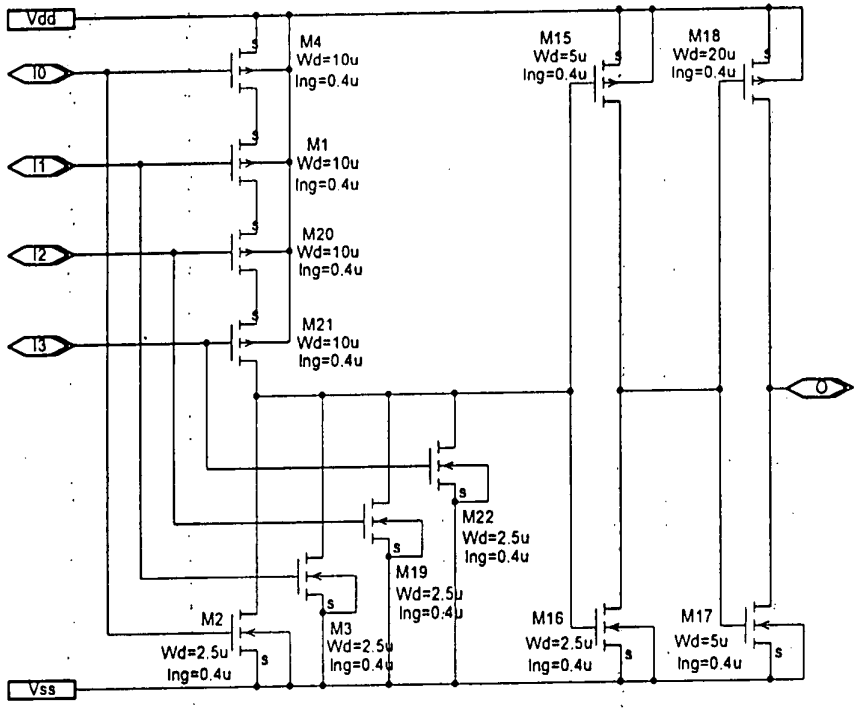

Vdd
I0
I1
I2
I3
Vss
O
M4
Wd=10u
lng=0.4u
M1
Wd=10u
lng=0.4u
M20
Wd=10u
lng=0.4u
M21
Wd=10u
lng=0.4u
M15
Wd=5u
lng=0.4u
M18
Wd=20u
lng=0.4u
M22
Wd=2.5u
lng=0.4u
M19
Wd=2.5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M3
Wd=2.5u
lng=0.4u
M16
Wd=2.5u
lng=0.4u
M17
Wd=5u
lng=0.4u
s

FIG. 153

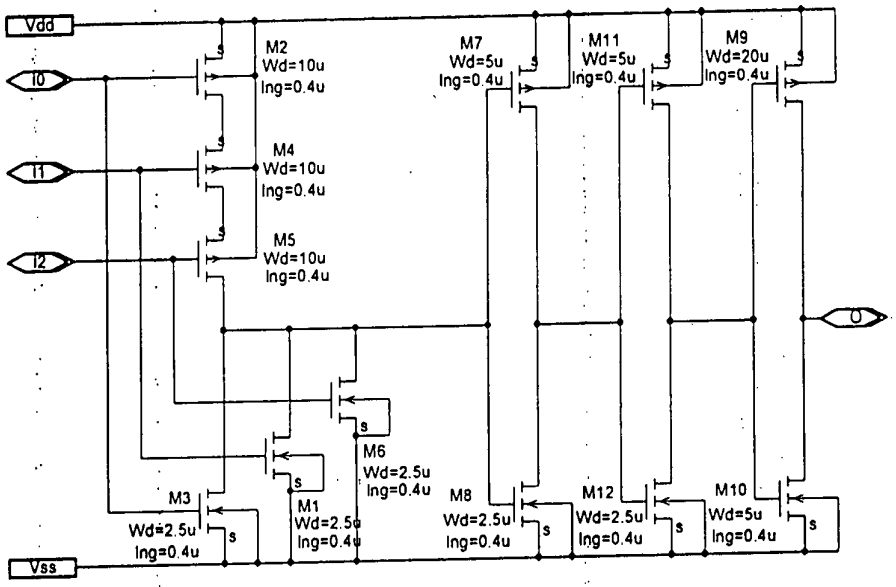

Vdd
I0
I1
I2
Vss
O
M1
Wd=2.5u
lng=0.4u
M2
Wd=10u
lng=0.4u
M3
Wd=2.5u
lng=0.4u
M4
Wd=10u
lng=0.4u
M5
Wd=10u
lng=0.4u
M6
Wd=2.5u
lng=0.4u
M7
Wd=5u
lng=0.4u
M8
Wd=2.5u
lng=0.4u
M9
Wd=20u
lng=0.4u
M10
Wd=5u
lng=0.4u
M11
Wd=5u
lng=0.4u
M12
Wd=2.5u
lng=0.4u

FIG. 154

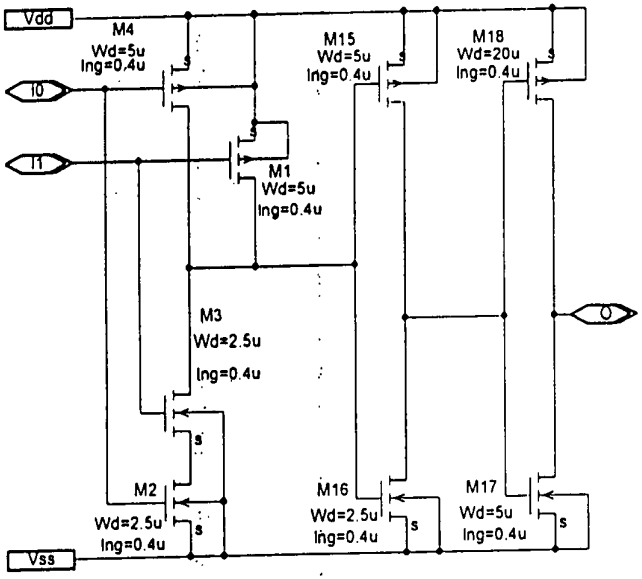

Vdd
M4
Wd=5u
lng=0.4u
I0
I1
M1
Wd=5u
lng=0.4u
M15
Wd=5u
lng=0.4u
M18
Wd=20u
lng=0.4u
M3
Wd=2.5u
lng=0.4u
O
M2
Wd=2.5u
lng=0.4u
M16
Wd=2.5u
lng=0.4u
M17
Wd=5u
lng=0.4u
Vss

FIG. 155

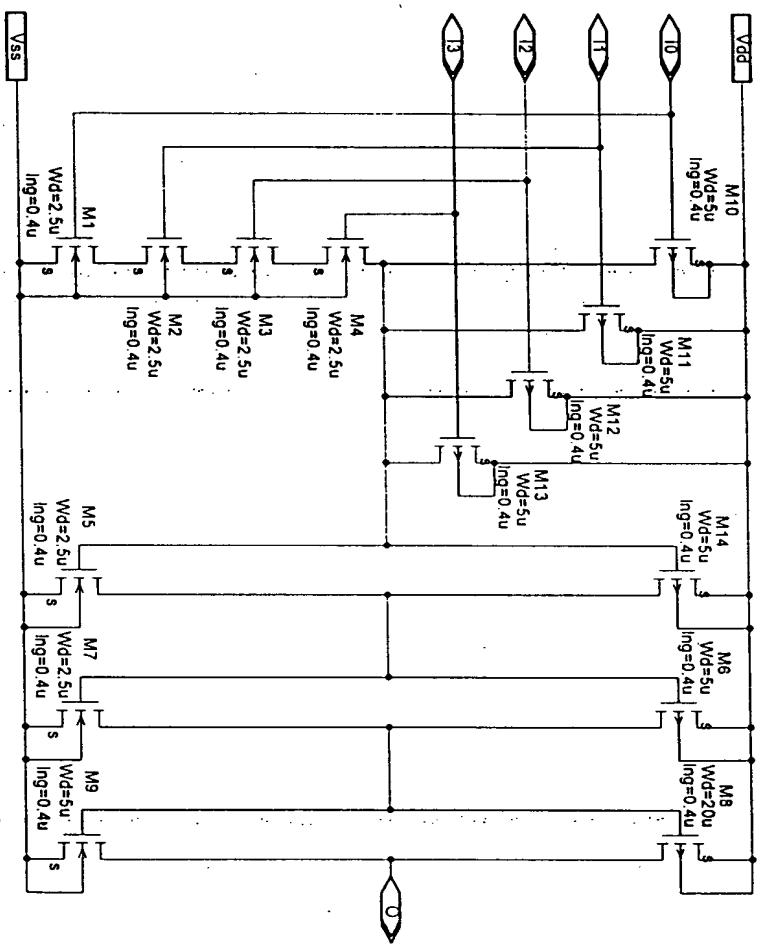

Vss
Vdd
I3
I2
I1
I0
O
M1
Wd=2.5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M3
Wd=2.5u
lng=0.4u
M4
Wd=2.5u
lng=0.4u
M5
Wd=2.5u
lng=0.4u
M7
Wd=2.5u
lng=0.4u
M9
Wd=5u
lng=0.4u
M10
Wd=5u
lng=0.4u
M11
Wd=5u
lng=0.4u
M12
Wd=5u
lng=0.4u
M13
Wd=5u
lng=0.4u
M14
Wd=5u
lng=0.4u
M6
Wd=5u
lng=0.4u
M8
Wd=20u
lng=0.4u

FIG. 1A

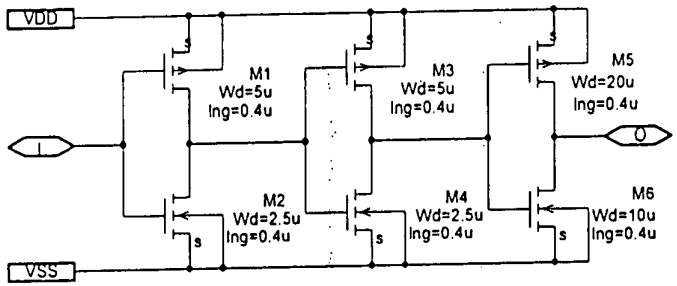

VDD
VSS
I
O
M1
Wd=5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M3
Wd=5u
lng=0.4u
M4
Wd=2.5u
lng=0.4u
M5
Wd=20u
lng=0.4u
M6
Wd=10u
lng=0.4u
s

FIG. 15 7

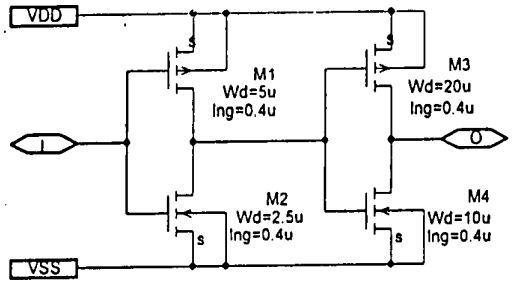

VDD
VSS
I
O
M1
Wd=5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
M3
Wd=20u
lng=0.4u
M4
Wd=10u
lng=0.4u
s

FIG. 15B

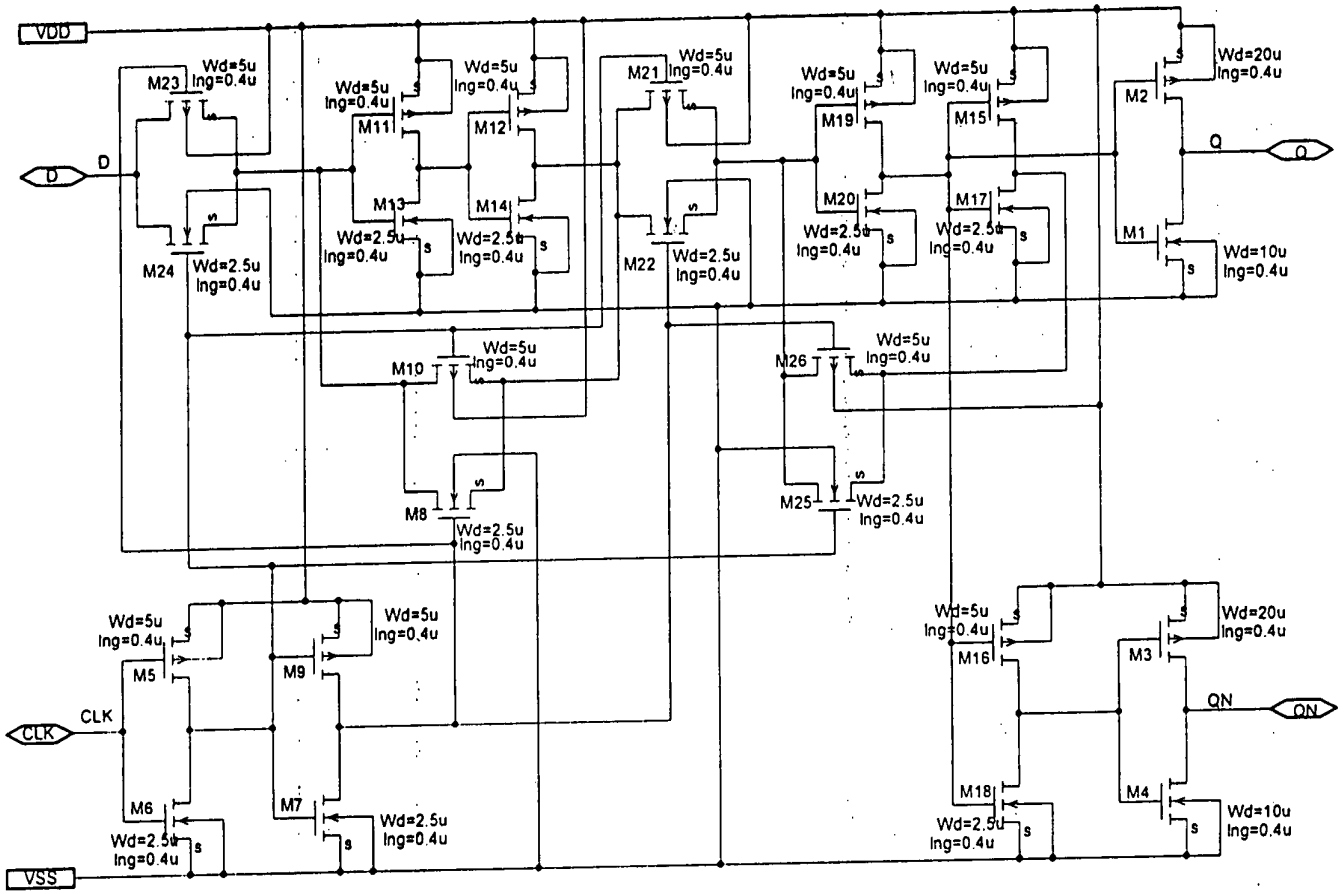


FIG 159

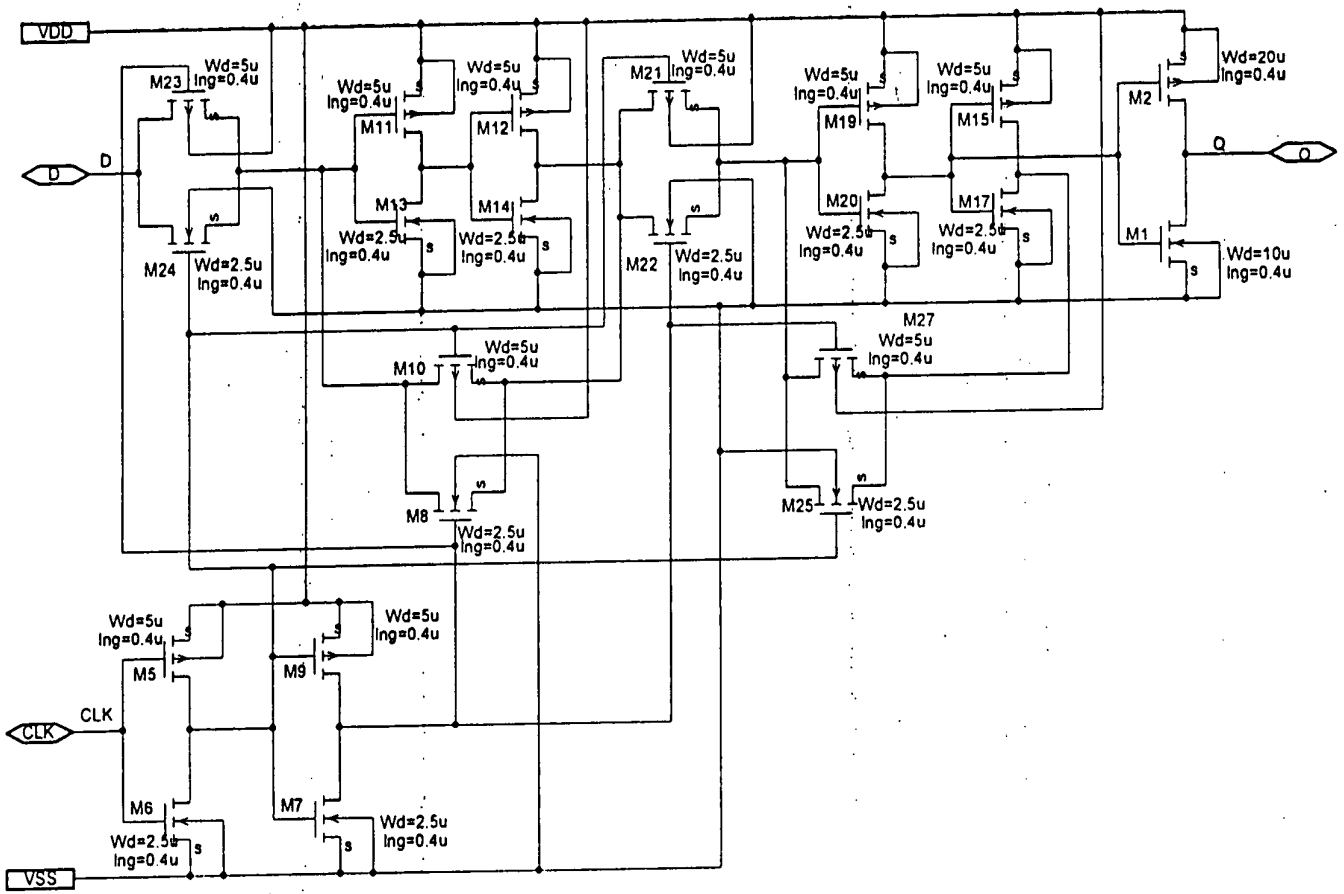

VDD
D
CLK
VSS
Q
M23
M24
M11
M12
M13
M14
M21
M22
M19
M20
M15
M17
M2
M1
M10
M27
M8
M25
M5
M9
M6
M7
Wd=5u
lng=0.4u
Wd=2.5u
lng=0.4u
Wd=20u
lng=0.4u
Wd=10u
lng=0.4u

FIG. 16O

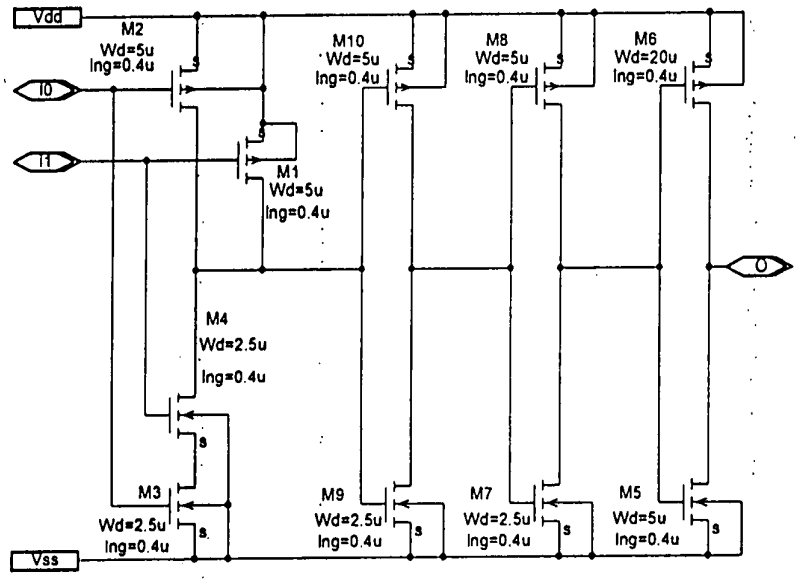

Vdd
M2
Wd=5u
lng=0.4u
I0
I1
M1
Wd=5u
lng=0.4u
M10
Wd=5u
lng=0.4u
M8
Wd=5u
lng=0.4u
M6
Wd=20u
lng=0.4u
O
M4
Wd=2.5u
lng=0.4u
M3
Wd=2.5u
lng=0.4u
M9
Wd=2.5u
lng=0.4u
M7
Wd=2.5u
lng=0.4u
M5
Wd=5u
lng=0.4u
Vss

FIG 16J